VIEW OF THE TREAD MILL FOR THE EMPLOYMENT OF PRISONERS,
ERECTED AT THE HOUSE OF CORRECTION AT BRIXTON, BY Mr. Wm. CUBITT OF IPSWICH.

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DESCRIPTION

OF THE

TREAD MILL,

FOR

THE EMPLOYMENT OF PRISONERS,

WITH

OBSERVATIONS ON ITS MANAGEMENT,

ACCOMPANIED BY A PLATE AND DESCRIPTION OF

A NEW INSTRUMENT,

BY WHICH

THE DAILY AMOUNT OF INDIVIDUAL LABOUR MAY BE

DETERMINED BY INSPECTION,

AND

REGULATED WITH UNIFORMITY AND PRECISION.

PUBLISHED BY THE COMMITTEE

OF

The Society

FOR THE

IMPROVEMENT OF PRISON DISCIPLINE, *&c.*

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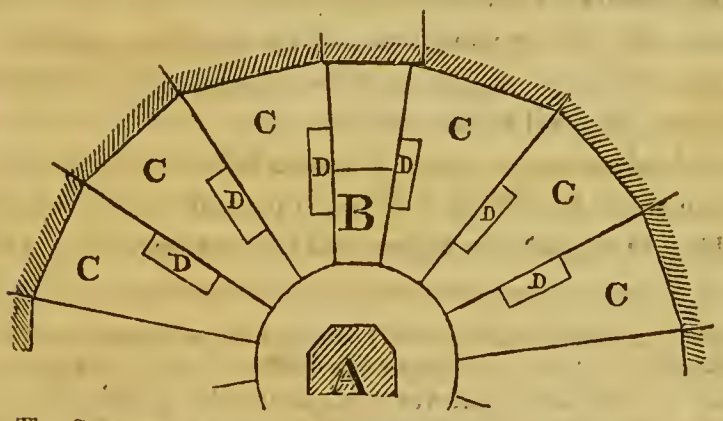
DESCRIPTION,

&c. &c.

THE annexed engraving exhibits a party of prisoners in the act of working one of the Tread-wheels of the Discipline Mill, invented by Mr. CUBITT, of Ipswich, and recently erected at the House of Correction for the county of Surrey, situated at Brixton. The view is taken from a corner of one of the ten airing yards of the prison, all of which radiate from the governor's house in the centre, which is seen in the drawing at the opposite end of the yard, so that from his windows *he commands a complete view into all the yards.** The building which appears

* The following rough Diagram will explain the relative position of the Tread-wheels with the Governor's central residence and the Mill-house:—



A.—The Governor's house — the windows commanding a view into the surrounding yards.

B.—The Mill-house.

CCC.—The yards, having next to the centre a strong iron railing, and enclosed by the range of building containing the prisoners' wards and cells. (a)

DD. — The Tread-wheels, erected against the radiating walls, covered by a slight shed.

(a) This circular form of building, enclosing the yards, renders the Plan objectionable for a Prison. The distance of the building, occupied by the prisoners, from the Governor's residence, precludes an unobserved and ready access, as well as facility of inspection into the day-rooms, &c.— objects so essential to every good Prison design.

in the Engraving behind the Tread-wheel shed, is the Mill-house, containing the necessary machinery for grinding corn, for which purpose there are four pairs of stones, &c. On the right side of this building, a pipe is seen, passing up to the roof, on which is placed a large cast-iron reservoir, capable of holding about 6500 gallons of water, for the service of the prison. This reservoir is filled from a well behind the Mill-house, nearly 200 feet deep, by means of a forcing-pump, connected with the principal axis which works the machinery of the Mill.—This axis or shaft passes under the pavement of the several yards, and by means of universal joints* at every turn communicates with the Tread-wheel of each class.

The Tread-wheel, which is represented in the centre of the Engraving, is exactly similar to a common water-wheel; the stepping-boards upon its circumference are of sufficient length to allow standing room for a row of fifteen persons.† The weight of these persons—the first moving power of the machine—produces the greatest effect when applied upon the circumference of the Wheel at or near the level of its axle; to secure, therefore, this mechanical advantage, a screen of boards is fixed up in an inclined position above the Wheel, in order to prevent the prisoners from climbing or stepping up higher than the level required. A hand-

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* It is by means of these universal joints upon the main shaft connecting the Tread-wheels with the machinery of the mill or pumps, that the relative position of each may be varied so as to suit the plan of almost any prison. On this subject, it may be proper to observe, that the Mill-house should be so placed as to exclude as much as possible any thoroughfare in a prison, by the passing and repassing of carts with corn and flour. When the Mill-house is situated outside the boundary wall of the Prison, every inconvenience of that kind is avoided, and the security and quiet of the Prison is promoted.—Care should, however, be taken that such building be *detached* from the outer wall, lest the security of that boundary be impaired.

† Twenty inches is the common allowance of standing room to each man. There are at present ten Tread-wheels erected in this House of Correction, one in each yard: two of these wheels are capable of holding six persons each; two, nine persons each; four, fifteen persons each; and two wheels, eighteen persons each;—making up altogether 126 persons.

rail is fixed upon this screen, by holding which they retain their upright position upon the revolving wheel;* the nearest end is exposed to view in the Plate, in order to represent its cylindrical form much more distinctly than could otherwise have been done. In the original, however, both ends are closely boarded up, so that the prisoners have no access to the interior of the wheel, and all risk of injury is prevented. A light shed protects the prisoners as well in wet weather, as from the heat of the sun in summer; and it is so constructed as not to interfere with the Governor's view of the prisoners, nor to lessen the security of the yards.

The Tread-wheel is set to work in the following manner. The party of prisoners ascend at one end by means of steps, and when the requisite number are ranged upon the Wheel, it commences its revolution. The effort, then, to each individual of the party, is simply that of ascending an *endless* flight of steps, the combined weight of the prisoners acting upon every successive stepping-board, precisely as a stream of water upon the float-boards of a water-wheel. This operation is maintained without intermission during the hours of labour, by the appointment of a certain portion of the class to relieve the party on the wheel. These changes are performed at regular intervals determined by signal, when the prisoner at one end of the wheel descends for rest, another at the same moment ascends at the opposite extremity of the wheel, as represented in the frontispiece.† By this method, the proper number of men on the wheel is con-

* It was discovered, in one recent instance, that in consequence of the hand-rail projecting too forward, the prisoners had the means of leaning or resting upon it; by which loss of weight, the working of the wheel was checked, and the labour to the prisoners became much lightened. To obviate this, it was found necessary to have the hand-rail made sufficiently narrow, and so fixed upon the screen of boards in front of the prisoners, as fully to afford them the means of supporting themselves upon the wheel, but without allowing them the means of evading the labour.

† At the Bridewell, in Edinburgh, these changes are announced by means of a bell attached to the machinery; the bell is capable of being set so as to give the signal at intervals of any length that may be desired.

tinually kept up, and the work is equally apportioned to every man. The degree of labour to each prisoner in a given time is also determined with great precision, by regulating the proportion of working and resting men one to the other; or, which amounts to the same thing, the relative proportion of those required to work the wheel with the whole number of the class; thus, if ten out of fifteen men are appointed to be on the wheel, each man will have forty minutes labour, and twenty minutes rest in every hour.

In order to guard against interruption to the regular employment of the prisoners on the Tread-wheels, which might happen from the supply of work in the Mill at any time falling short, a fly-wheel is attached to the principal shaft in the Mill-house, which is represented in the frontispiece on the roof of the building. The fly-boards of this wheel are connected with a pair of regulating balls, which, as the velocity of the wheel increases, tend by their centrifugal action to expand the fly-boards; by these means, the requisite degree of resistance is presented to the motion of the Tread-wheel machinery, and the labour of the prisoners suffers no interruption.*

In the management of this machine for the employment of prisoners, particular attention will be requisite, in order to regulate the proportion of working and resting men with the velocity of the Wheel, that a due degree of individual labour may at all times be steadily maintained. For it will be evident that if the number of men appointed as relays, bear too large a proportion to the whole number of the class, and if the revolutions of the Wheel be suffered from any circumstance to be performed too slowly,

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* At Cold-bath Fields Prison, a regulating fly is attached to the Tread-wheel machinery, by which the power derived from the action of about 240 prisoners is expended in the air.

The resistance presented by the action of a Fly increases with its velocity; and after a certain time that resistance becomes so powerful as to prevent all farther acceleration, when the motion of the machinery remains uniform.

the discipline of the Tread-mill may become so light to each prisoner as entirely to fail of its salutary effects. If, on the contrary, the rate of revolution be too quick, and the proportion of resting prisoners too small, the individual labour will be increased, and if carried too far, the health of the prisoner will be exposed to injury. It is very desirable that these two extremes should at all times be carefully guarded against, and that in justice to the convict the individual labour should be determined with as much precision, and maintained with as much uniformity, as possible. Again, the duration of general labour for the day in summer being at most Prisons half as long again as in winter, if the same arrangement in regard to proportion and velocity which have been adopted in the latter season be also followed in the long days of summer, a prisoner might incur the risk of suffering; at all events, it would render a sentence of one month of hard labour at the Tread-mill, a very unequal punishment in summer and in winter. Although it does not appear, as will be shown by certificates transmitted from the several Prisons where the Tread-mill has been for some time in operation, that the labour is injurious to the health of the prisoners, (but on the contrary that it is a healthy employment); yet, from the preceding observations it must be evident, that without some means of determining the daily amount of individual labour, and of confining that quantity at all times within certain safe limits, circumstances might occur which would inadvertently lead to the infliction of very severe punishment. It seems, therefore, an object of great importance to consider, by what simple method the degree or quantity of Tread-wheel labour to each prisoner may be accurately measured. If the individual labour be capable of precise measurement, there will be little difficulty in adopting certain fair limits within which the amount for the day may be confined, without any risk on the one hand of its becoming to the prisoner mere recreation, or on the other the means of injury to his health.

In the application of human exertion to this species of mechanical labour, there are two objects to be considered

as affecting the measurement of such exertion; first, the *rate* or *velocity* with which the exertion is maintained; secondly, its *duration*. The *rate* of exertion maintained by a prisoner on the Tread-wheel, will be determined by the velocity of its revolutions, and by the height of the steps; thus, if a prisoner treads upon the steps of a wheel which are eight inches asunder, and if the velocity of its revolution be fifty steps per minute, he will have to move or lift his own weight over 33⅓ feet per minute, or maintain a rate of exertion equal to 2000 feet of ascent per hour. To complete the measure of individual labour, the *duration* of this rate of exertion is next to be considered. This will be affected by the proportion of resting and labouring prisoners, in which a class or gang may be appointed to work on a Tread-wheel, and by the number of hours which the regulations of the Prison require for daily labour at different seasons of the year. Thus, if two-thirds of a class are appointed to be on the wheel, and one-third to be off as relays, and if the number of hours of general labour for the day be ten, as in the summer season, the duration of actual labour to each man for that day will be 6⅔ hours, with 3⅓ hours of rest. Then, if the rate of exertion, 2000 feet per hour, be multiplied by the actual duration of it, viz. 6⅔ hours, we shall have a result of 13,333 *feet ascent as the measure* of each man's labour at the wheel for the whole day. This measure in feet ascent may, therefore, be taken as the most simple and correct standard, for determining any quantity of actual exertion performed by a person working at the Tread-mill.*

* The quantity of mechanical power exerted in this instance would, without doubt, be measured more scientifically, by taking the product of the weight multiplied by the space over which that weight has been moved or lifted in a given time; but by leaving out of the calculation the weight of a man, the measure becomes far more simple, and equally accurate for the purpose in view. To complete, however, the above calculation, so as to indicate the mechanical power exerted by each man on the Tread-wheel, we have to multiply his weight, which may be taken at the usual average of 150 lbs. by 2000, the number of feet that weight has passed over in the hour, which gives 300,000; this number being multiplied by 6⅔ the length of time that rate of action has been maintained for the day, the result is found to be 2,000,000 lbs.

In going through these details, by which the measurement of individual labour is so easily explained, it may have been remarked, that the result of any case of Tread-wheel labour must depend upon several circumstances connected with the management of the machine, which are open to considerable variation. First, the *rate of exertion* is determined by the velocity of the Tread-wheel, and by the height of the steps; the former may be accelerated or retarded by the quantity of work or *service* (as it is termed) which is to be performed in the Mill; and in this respect the interest of the party to whom the profits of the Mill belong, happens to fall on the most favourable side in relation to the labouring prisoners, since the heavier the service, the slower in general will be the revolutions of the Tread-wheel. The machinery, however, to which the power of Tread-wheels is applied, in most cases affords several degrees of service or employment, by which the manager has considerable scope for regulating the velocity; and in case of work falling short the Fly will come into use. The height of the step, which varies in the different Tread-mills already erected, will materially affect the amount of daily exertion,—half an inch more or less in that respect making a difference of nearly one thousand feet ascent in a day of ten hours general labour. Secondly, the *duration* of the individual labour depends, as has already been observed, upon the time of general employment which the Rules of the Prison may appoint for the day, and upon the proportion which the number of working and resting men bear to each other, or to the

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raised one foot, as the mechanical measure of daily exertion. The diameter of the Tread-wheel does not form any part of the above calculation. The mechanical power of course depends upon the diameter of a wheel; but as great power is not the leading object in the erection of these machines, it is found that the most convenient sizes for Tread-wheels are from four to six feet diameter: and the height of the steps from seven to eight inches. Wheels of larger diameter occasion increased expense, and occupy greater space in the Prison. There might, however, be some advantage in having one or more of the wheels in the Prison of different diameters, as they would afford the means of varying the rate of exertion to a class, when occasion might require it.

whole number of the class: the former in most Prisons may be computed at from seven hours in winter to ten hours in summer; and the latter is capable of being varied, according to the exigencies of the Prison in respect of numbers, or as the other particulars of Tread-mill management may, at any time, require.

Although under every possible combination of circumstances, the same method of calculating the labour of the individual is equally applicable, yet it will not so readily appear, if a specific quantity for the day be laid down, what combinations must be selected to attain the end. Suppose, for example, with the view of removing any risk of severity or injury to the prisoner, that his work for the day be ordered to be limited to a certain amount of feet in ascent. To discover what arrangements must be made to accomplish this object, is a question of so complicated a nature, that the method of solving it would not occur without close consideration; and so variable are the circumstances attending the management of this employment, from the frequent fluctuation in the number of prisoners, as well as in the rate and duration of their labour, &c. that the difficulty of fulfilling such a regulation became still further increased. In following up, however, the calculations by a few examples, the Committee conceived that as the several details vary one with another in regular proportion, they might be very conveniently laid down upon a scale, in a logarithmic series; by which means a ready method would be afforded by mere inspection both of measuring the result of any example of Tread-wheel labour, and of determining the necessary combinations of management. This idea has been carried into execution in a very ingenious and satisfactory manner by Mr. Bate, Mathematical Instrument Maker to the Board of Excise,* who has constructed an instrument, which completely answers the purposes in view; and will, it is hoped, prove serviceable in introducing greater precision of management, and in promoting a greater uniformity of practice, than has hitherto prevailed at the several Prisons where Tread-wheel labour is adopted.

* No. 17, Poultry, London.

SLIDING SCALE
for Tread-Wheel labour.

Proportions of Prisoners on the Wheel in Claſses of

6 to 12	13 to 14 & 21 & 22	15 & 17 & 25	16 & 18 & 20 & 24	19 & & 28	23 & & 32	26 & 27 & 30	29 & & 31
6/11	3/11	4/25	5/18	5/29	6/23	7/27	8/31
5/9	2/7	7/25	5/17	6/29	9/32	7/26	8/29
4/7	3/10	5/17	7/21	9/28	7/23	8/27	9/31
7/22	4/23	7/22	5/16	6/29	9/32	8/27	9/29
5/8	5/24	8/25	7/20	9/28	8/23	9/26	10/32
7/11	4/21	6/17	9/25	7/29	11/32	10/30	11/31
5/7	3/8	9/25	7/18	11/28	9/23	10/27	11/29
7/10	5/12	7/17	9/22	8/29	13/32	11/27	12/31
5/6	3/7	9/22	7/16	11/28	10/23	11/26	12/29
6/7	4/9	11/25	9/20	9/29	13/32	13/30	14/31
	5/11	7/15	11/24	13/28	11/23	13/27	14/29
	6/13	8/17	9/19	11/28	15/32	14/27	15/31
	10/21	13/25	11/20	13/29	13/23	15/26	16/29
	11/21	13/25	10/19	15/28	14/27	16/31	17/29
	7/13	9/17	8/15	11/29	17/32	15/28	17/31
	6/11	8/15	13/24	15/28	13/23	16/29	18/31
	5/9	11/20	11/20	11/29	17/30	15/26	17/29
	4/7	14/25	9/16	13/28	19/32	16/27	18/31
	7/12	13/22	10/17	11/29	15/26	17/27	19/32
	5/8	8/13	11/18	17/28	14/23	19/30	18/29
	7/11	13/21	9/14	13/29	17/27	20/31	20/31
	5/7	9/14	16/25	11/27	13/20	15/23	17/26	19/29
	7/10	15/22	17/25	19/28	21/32	22/31
	5/7	9/13	11/17	13/29	16/23	20/29
	8/11	12/17	17/24	19/27	22/31
		18/25	13/18	23/32	24/29
		11/15	14/19	17/23	19/26	20/27	23/31
	16/21	19/25	22/29
	10/13	13/17	23/30	24/31
	7/9	7/22	9/12	25/32	18/23	23/29
	11/14	19/24	15/19	21/26	25/32
	9/11	17/21	13/16	23/28	19/23	22/27	24/30
	5/6	14/17	21/25	16/19	17/20	23/27	26/32
	6/7	11/13	17/20

Feet Ascent.

Index for Feet Ascent.

Steps per Minute.

(TIME in Hours &c.)

Index for the Time of General Labour as appointed by the Rules of the Prison.

Constructed &

Published by R.B.Bate 17 Poultry, London. March 31st 1823 (For the Prison Discipline Society.) Price 5.

DESCRIPTION OF THE

"*Sliding Scale for Tread-wheel Labour.*"

This Instrument, which is represented in the annexed Plate, consists of three principal parts or divisions; the first, beginning on the left side of the Scale, contains the Ascent in feet, and the Steps per minute; upon the second (which is the Slider) is found the Time; and the third part contains the Proportions of a class to be employed *on the Wheel*, with an Index at the bottom referring to the time of general labour per day as appointed by the Prison Rules.

The ascent in feet, which, agreeably to the foregoing observations, forms the standard of measurement for Tread-wheel labour, is laid down from 2000 to 30,000 feet. The divisions, or fractional points which occur from 2000 to 10,000 feet, express 100 feet each; they then, it will be observed, become wider, and denote 200 feet each from 10,000 to 30,000 feet, the limit of the Scale.

Below the "Feet ascent" are placed the "Steps per minute;" these range from twenty to eighty steps, (limits not likely to be exceeded in any case): each division, or fractional point, reads off single steps. The index referring to the height of these steps, is placed near to the top of the slider, which forms the second or middle part of the Scale: as the height of the steps is found to vary in different wheels, a few index-divisions are inserted for steps of 7 inches, $7\frac{1}{2}$, 8 inches, &c.*

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* On application for the purchase of the Instrument to be used for the Tread-mill of any particular Prison, it will be necessary to be provided with the *exact* height of the steps, in order that this Index may be inserted in *the most accurate position* for the Tread-mill in question. The height should be taken *from the upper surface* of one stepping-board, *to the upper surface* of the next, applying the measure to the outer edge of each board, which is the part receiving the step of the prisoner. Care must also be taken to obtain the fair average height, as a small difference in the height of the steps may occur in the same wheel, in consequence of some of the boards being of unequal thickness.

Carrying the eye downward on either edge of the Slider, will be found "the Time" expressed in hours, with divisions, or fractional parts of ten minutes each throughout; but the order of the divisions being downward, or contrary to that of the two preceding series, care must be taken to read them off accordingly. A little practice will soon enable the reader to estimate by the eye intermediate points to single minutes.

On the third division of the Scale are inserted the "Proportions of Prisoners on the Wheel," in classes consisting of any number under thirty-two persons; these proportions, for the sake of easy reference, are tabulated in columns. The first column contains the most simple proportions, as $\frac{1}{4}$, $\frac{1}{3}$, &c. to $\frac{4}{5}$ths. In this first column, horizontal lines of different lengths, and at irregular intervals, are observed; these lines are inserted for the purpose of indicating the exact horizontal position of the proportion required, as well as to direct the eye to the column in which it is to be found: thus, where any one of these lines is carried entirely across the column, it shows that the proportion will be found in the most distant column from the Slider; in the same manner a short line indicates that it is to be met with proportionably short of the furthest column on the Scale—the fine perpendicular lines representing the numerical order of the columns. The second column, which is headed "6 to 12," includes all the proportions in which classes of six to twelve prisoners may be divided, and which are not to be found in a reduced fraction in the first column: thus, $\frac{3}{6}$, $\frac{4}{8}$, $\frac{5}{10}$, being equal to and expressed by $\frac{1}{2}$ in the first column, are dropped in the second, which does away with the necessity of crowding whole series of proportions into the several columns. The third column comprises all the proportions in which classes of 13, 14, 21, and 22 prisoners may be divided, which are not previously given in a reduced form. The fourth column contains all those proportions of classes consisting of 15, 17, and 25 prisoners, not already given, and so on with the rest of the columns as their respective titles express. Suppose, for example, that the number of prisoners in a class

was twenty-two, and that thirteen of them, or $\frac{13}{22}$ were observed to be on the wheel: in looking for the column for classes of 22 prisoners, and carrying the eye downward, the proportion sought for will be readily seen: but if $\frac{14}{22}$ had been required, it would not have been found, because being equal to $\frac{7}{11}$ it would appear in its respective column. A little practice will soon render this part of the Scale easily understood.

Below these columns is inserted the second Index, or fixed point on the Scale. This is to be used to mark off the time of general employment for the day, as appointed by the Rules of the Prison;—for the sake of distinction it is called the "Index for the time of General Labour."

The following Examples will point out the use of the Scale as applicable, first, to the measurement of Tread-wheel labour, and secondly, to determine the combinations necessary for its management.

Of Measurement.

Example I.

The time appointed for general employment at the Tread-mill in a Prison being eleven hours per day,*—the proportion of prisoners placed on the Wheels being two-thirds of the class,—and the velocity of the Tread-wheels being forty-one steps of eight inches per minute;—required the amount of individual labour performed for the day.

Look for 11 hours on the *right* edge of the slider; having found it, move the slider so as to bring that hour to the "Index for the time of general labour:" this being done, look in the first column of "Proportions" for $\frac{2}{3}$, and observe the point of time on the slider immediately coinciding with that proportion, which is exactly 7 hours and 20 minutes:—this will be the time of actual labour which falls to the lot of each prisoner for the

* This time is taken for the sake of showing from the annexed Plate itself the solution of the three first Examples; the Instrument being set to *that* position solely because it was the most convenient for engraving the Plate.

day. Having thus ascertained the duration of individual labour per day, the next part of the question is, the rate at which that labour has been maintained. For this purpose, look on the *left* edge of the slider for 7 hours and 20 minutes; having found it, move the slider until that point of time exactly coincides with 41 "steps per minute;" which being done, carry the eye upward to the "index of the feet ascent," and the index for eight inch steps is seen pointing at 12,000 feet, which is the amount or measure of labour performed by each prisoner on the Tread-wheel for the day.

EXAMPLE II.

If the number of a class be not divisible into thirds, as in the foregoing example, for instance, suppose the number of prisoners in the class be twenty-two, that thirteen are appointed to be on the Wheel,—that the velocity of the Tread-wheel is forty-six steps, and the time of general labour eleven hours as before,—required the individual labour for the day.

The index of general labour being set at 11, as before, look for $\frac{1}{2}\frac{3}{2}$ in the column for classes of 22, which is the third column; as $\frac{1}{2}\frac{3}{2}$ is a larger proportion than one-half, it will be found below that fraction; on the slider opposite $\frac{1}{2}\frac{3}{2}$, read off six hours and a half, for the duration of individual labour for the day. Then setting six hours and a half on the left edge of the slider to forty-six steps, and the index for eight inch steps will be found pointing at 12,000 feet, the amount of individual labour for the day.

Of Management.

EXAMPLE III.

THE time of general labour for the day, as appointed by the Rules of the Prison, being eleven hours,—the amount of individual labour to be performed for the day, being limited to 12,000 feet ascent,—and the *service* on the Mill being so heavy as to reduce the velocity of the Tread-wheel to forty steps of eight inches per minute; the Governor requires to know in what proportion he must appoint a class of twenty-two prisoners to work the wheel

(holding fifteen persons) that the time of general labour, and the amount of individual labour for the day, may be strictly fulfilled.

The index for eight-inch steps being set at 12,000 feet, opposite to 40 steps will be found 7 hours 30 minutes, the time of individual labour per day; then set the index of general labour to 11 hours, and carrying the eye upward on the same edge of the slider to 7 hours 30 minutes, it is found to coincide with a fine horizontal line in the first column, which (extending to the *third* fine perpendicular line) indicates that the proportion sought for will be found in the third column, which is $\frac{15}{22}$, the proportion required.

Example IV.

The time of general labour being, as in winter, seven hours per day, and the proportion of prisoners on the Tread-wheel being four-fifths, at what velocity must the Wheel revolve, to increase the amount of individual labour for the day to 11,000 feet ascent?

Set the index of general labour at 7 hours, and opposite to the proportion $\frac{4}{5}$ths, will be found 5 hours 36 minutes; then set the eight-inch index to 11,000 feet, and opposite to 5 hours 36 minutes will be found 49 steps per minute, the velocity required.

Example V.

The amount of individual labour being fixed at or near 12,000 feet ascent, in a day of nine hours general labour, at two Prisons, viz. Stafford and Cold-bath Fields, Middlesex; at the former Prison, the velocity of the Tread-wheel is stated to be sixty steps of seven inches per minute; and at the latter Prison forty-four steps of eight inches: it is required to know what proportions of prisoners on the Wheel must be adopted at each Prison, so as to impose on their respective prisoners the same amount of individual labour.

Set the seven-inch index to 12,000 feet, and opposite 60 steps read off 5 hours 44 minutes; then set the index of general labour to 9 hours, and nearly opposite 5 hours 44 minutes will be found $\frac{16}{25}$ths, the most suitable proportion for the Stafford

Wheel, which holds sixteen men. Proceeding in the same manner for Cold-bath Fields, having set the eight-inch index to 12,000, opposite 44 steps is found 6 hours 50 minutes; then setting the index of general labour to nine hours, and nearly opposite 6 hours 50 minutes is found $\frac{10}{15}=\frac{30}{45}$ths, as the proper proportion for the Wheel at Cold-bath Fields, which holds thirty prisoners. When these arrangements are adopted, the individual labour at each Prison becomes very nearly uniform;—the amount at the former Prison being in exact figures 12,096 feet, that at the latter 12,179 feet.

By this last Example it will be seen that the management of the Tread-mill (even under the present diversified circumstances of construction and of performance) may, by the aid of this Sliding Scale, be conducted upon a very uniform system of operation. The duration of labour for the day being limited to a certain number of hours according to the season, might, with much propriety, be the subject of a general regulation at every House of Correction. The daily amount of Tread-mill labour to the individual convict, might also, without difficulty, be confined within certain limits of feet ascent; in determining which, the examples in the succeeding tables (being the results of past experience) will be found serviceable. If, however, the number of working hours per day, continue (as is the case at present) to be unequal at different prisons, still the quantum of actual labour to the individual prisoner may, by the use of the scale, be rendered very nearly uniform at every prison where the Tread-mill is in operation,—an object of much importance to the prison discipline of the country.

The following Tables, calculated from returns very recently transmitted to the Committee, present a comparative view of Tread-mill labour enforced at the respective Prisons. In Table I. all the results are reduced to *one general average* of duration per day, viz. eight hours; by which the comparative rates of individual labour at the several prisons are exhibited in one

view. This table affords a striking picture of the inequality with which a sentence of hard labour must, according to present circumstances, be enforced at the Houses of Correction in different counties; and will show the importance of introducing a more uniform system, an object which the sliding scale appears well calculated to promote.* The second Table also furnishes information of some interest; the examples are computed from the duration of daily labour in summer and in winter, as ordered by the present Rules of each of the Prisons referred to; and upon the presumption (warranted by the returns) that the same course of management, already particularized in Table I. continues unaltered at each Prison throughout the year. By this Table is shown the different rates of labour to which a convict would be subjected on a sentence to the same House of Correction in summer and in winter; from which it would appear that the punishment in summer is in most instances fifty per cent. more severe than that inflicted by the same sentence in winter, and vice versâ. By the application of the Sliding Scale to these very unequal results, it may be seen (as pointed out in Example IV.) in what manner the labour at the Tread-wheel in summer and in winter may be brought within limits better suited to each season: and thus the punishment of hard labour may be rendered more uniform throughout the year.

The remarkable difference which appears in the several results of Tread-wheel labour is sufficiently accounted for by the imperfect manner in which new Machinery of this nature must at first be expected to be worked.

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* The Examples in the Tables will be found very convenient for ascertaining the use of the Scale.

TABLE I

Showing the rate of labour at the following Prisons.

Name of Prison.	Proportion of working and resting Prisoners at the Wheel.	Velocity of Tread-wheel per Minute.	Result in feet of ascent, being the rate of individual labour at each Prison in a day, taken at an average of Eight Hours general labour.
Lancaster Castle*	3 on, 6 off, *i. e.* 1–3rd on, 2–3rds off.	50 steps of 8 inches.	....5340 feet.
Lewes	½ on, ½ off.	45 steps of 7 inches.	....6300.
Chelmsford { Felons	3–4ths and 1–4th.	32 steps of 7½ inches.	....7200.
Misdemeanants }	2–3rds and 1–3rd.	.....	....6400.
Bedford.	2–3rds and 1–3rd.	40 steps of 7 inches.	....7460.
Sometimes	9 on 5 off, *i. e.* 9-14ths on	.....	....7200.
Haverford West ..... Men and Women	½ and ½	48 steps of 7½ inches.	....7200.
Swaffham	10 on and 3 off, *i. e.* 10–13ths on.	32 steps of 8 inches.	....7850.
(Never exceed)	4–5ths and 1–5th.	.....	....8150.
St. Albans..... Men and Women†	½ and ½	50 steps of 8 inches, to 60 steps.	....8000. ....9600.
Leicester‡.....	½ and ½	60 steps of 7½ inches.	....9000.
Bury	2–3rds and 1–3rd.	50 steps of 7 inches.	....9330.
Cold-bath Fields, House of Correc^{n} for Middlesex } Men and Women	2-3rds and 1–3rd.	44 steps of 8 inches.	9380
Horsley.....	2–3rds and 1–3rd.	44 steps of 8 inches.	....9380.
Northallerton .. { Men...	3–4ths and 1–4th.	48 steps of 7 inches.	...10,080.
Women	3–4ths and 1–4th.	38 steps of 7 inches.	....7,980.
Cambridge (County)	2–3rds and 1–3rd.	51 steps of 7½ inches.	...10,175.

* "A small Tread-wheel for nine prisoners, ordered by way of experiment."

† "Those females that are strong and powerful are employed during the same number of hours as the men; the others only half the time."

‡ The proportions are reported to be very uncertain; if the prison happens to be full, the number of relays are high, and when the prisoners are reduced in number, the relays are fewer: it thus happens that great inequality of labour ensues, and as the velocity of the Tread-wheel is remarkably high, that inequality must be at times very considerable.

Table I.—*continued.*

Name of Prison	Proportion of working and resting Prisoners at the wheel.	Velocity of Tread-wheel per minute.	Result in feet of ascent, being the rate of individual labour at each Prison in a day, taken at an average of Eight Hours general labour.
Ipswich	2–3rds and 1–3rd.	48 steps of 8 inches.	... 10,250.
Exeter ... Men	15 on, 6 off, *i. e.* 15-21sts or 5-7ths on	48 steps of 7½ inches.	... 10,270.
(Never exceed)	3–4ths and 1–4th.	.....	... 10,800.
Women	½ and ½.	.....	.... 7200.
Hertford	3–4ths and 1–4th.	48 steps of 7½ inches.	... 10,800.
Also	2–3rds and 1–3rd.	.....	.... 9600.
Guildford..... Men ..	4–5ths and 1–5th.	48 steps of 7 inches.	... 10,750.
Women	3–4ths and 1–4th.	.....	... 10,080.
Reading	40 on, 16 off, *i. e.* 40-56ths and 5-7ths.	48 steps of 8 inches.	... 10,960.
Brixton (Men and Women)	3–4ths and 1–4th.	48 steps of 8 inches.	... 11,520.
Dorchester	3–4ths and 1–4th.	48 steps of 8 inches.	... 11,520.
Cafford.....	11 on, 5 off, *i. e.* 11–16ths on	60 steps of 7 inches.	... 11,550.
Durham*.....	3–4ths and 1–4th.	58 steps of 7 inches.	... 12,180.
Gloucester Penitentiary	32 on, 6 off, *i. e.* 32–38ths or 16–19ths on.	48 steps of 8 inches.	... 12,920.
Edinburgh Bridewell	3–4ths and 1–4th.	56 steps of 8 inches.	... 13,440.

* The prisoners at this gaol are not employed longer than seven hours at any time of the year under the present regulations.

N. B. The height of the steps is probably, in some instances, not perfectly accurate; in general, however, they may be depended upon, particular care having been used by precise explanations to obtain the measurement correctly.

TABLE II.

Showing the amount of Tread-mill labour per day in Winter and Summer, according to the present system of management.

Name of Prison.	Time of General Labour per Day, WINTER.	Amount of Individual Labour per Day.	Time of General Labour per Day. SUMMER.	Amount of Individual Labour per Day.
		Feet.		Feet.
Lancaster Castle.....	Seven Hours.	...4660...	Ten Hours.	6660
Lewes	Seven Hours.	...5510...	Eight Hours.	6300
Chelmsford { Felons ..... / Misdemeanan.	Seven Hours.	...6300... / ...5600...		
Bedford..... (Sometimes)	Six Hours.	...5600... / ...5400...	Nine and a half Hours.	8860 / 8570
Haverford West ..... Men and Women	Eight Hours.	...7200...	Twelve Hours.	10,800
Swaffham	'As long as light continues, excluding an hour and a half for meals." = 7½ Hours.*	...7350. .	Ten and a half Hours.*	10,300
St. Albans.....	Six Hours.	6000 to 7200	Eight Hours.	8000 to 9600
Leicester	Seven Hours.	...7875...	Twelve Hours.	15,500
Bury	"As long as day-light will permit," = Seven Hours.	...8170...	Ten and a half Hours.	12,250
Cold-bath Fields, House of Correcn for Middlesex Men and Women	Six and a half Hours.	...7620...	Nine Hours.	10,560
Durham	Five Hours.	...7610...	Seven Hours.	10,650
Horsley.....	Seven Hours.	...8220...	"From 6 A. M. to near sunset, with two hours release for meals." = 12 Hours.	14,080
Cambridge (County)	Seven Hours.	...8900...	Ten Hours.	12,725
Northallerton .. { Men .. / Women	Seven Hours.	...8820... / ...6980...	Nine Hours.	11,340 / 8975

* "On Wednesdays and Fridays an intermission, to attend Divine Service."

Table II.—*continued.*

Name of Prison.	Time of General Labour per Day. WINTER.	Amount of Individual Labour per Day.	Time of General Labour per Day. SUMMER.	Amount of Individual Labour per Day.
		Feet.		Feet.
Ipswich	"As long as day-light will permit, excluding one hour for dinner." = Seven Hours.	8960	Ten Hours.	12,800
Exeter — Men	Seven Hours.	9000		
Exeter — Women		6300		
Hertford	Seven Hours.	9450	Nine Hours.	12,150
Guildford — Men	Seven Hours.	9400	Ten and a half Hours.	14,100
Guildford — Women		8820		13,230
Reading	Eight Hours.	10,960	Ten Hours.	13,700
Brixton	Seven Hours.	10,080	Ten & a half Hours	15,100
Dorchester	Seven Hours.	10,080	Ten Hours.	14,400
Stafford	Seven Hours.	10,100	"From about half past 5 in the morning, until 7 in the evening, with intermission of half an hour for breakfast, one hour for dinner, and half an hour in the afternoon for relaxation:"— actual duration Eleven and a half Hours.	16,630
Gloucester Penitentiary *	Six Hours.	9700	Ten Hours.	16,170
Edinburgh Bridewell	"Nine Hours in general."	15,120		

* The Rules laid down for General Labour at this Prison are; for the months of November, December, January, and February, Eight Hours; March, April, September, and October, Nine Hours; May, June, July, and August, Ten Hours.

N. B. The Tread-mills at several of these Prisons having been only completed since last Autumn, the Summer labour in such instances is nominal.

The following form, agreeably to the foregoing method of calculation, is proposed for a Register, in which the daily amount of individual labour may be recorded, and regularly laid before the Committee of Magistrates visiting the Prison.

Date.	Name of Class.	Duration of General Labour as appointed by the Rules.	Proportion in which the Class has worked the Tread-wheel (holding 13 Prisoners.)	Mean Velocity of the Tread-wheel in (eight) inch steps per minute.	Amount of Individual Labour in feet of ascent for the day.	Particulars of Work done, quantity or weight of Corn ground, &c.	
Dec.	Felons, N° 1.	7 Hours.	13–17ths on.	51 steps.	11,000		
Feb.	.....	8 Hours.	13–19ths.	50 steps.	11,000		
June	.....	10½ Hours.	13–21sts.	43 steps.	11,000		
Dec.	Misdemeanants, N° 1.	7 Hours.	Wheel holding about 10 prisoners 9–13ths on	51 steps.	10,000		
Feb.	.....	8 Hours.	10–16ths	50 steps.	10,000		
June	.....	10½ Hours.	10–18ths	43 steps.	10,000		

With the view of giving greater precision to this method of calculation, as well as of affording to the visiting Magistrates a certain check upon the general labour performed during a period of some length of time, it is proposed to furnish the Tread-wheel with a means of registering the number of its own revolutions; because, notwithstanding the complete control which the Sliding-scale affords over the *equalization* of the labour, the correct determination of its *amount* will depend altogether upon the accuracy with which the velocity of the wheel is ascertained. Of the several details which enter into the calculation and registry of individual labour, the rate of exertion alone remains uncertain,—the proportion of working and resting men, the time of general labour per day, and the height of the steps, being all known or easily ascertained with precision. It is,

therefore, considered an important object to introduce some simple and correct method for determining the velocity of the Tread-wheel. The views of the Committee, in this respect, have been met, in a very satisfactory manner by Mr. Bate, who has contrived an instrument capable of registering ten thousand revolutions of a Tread-wheel; a number comprising a period of one week's to two weeks' performance of a Wheel of five feet diameter, which is the most general dimension.

The instrument (which for the sake of distinction has been denominated a gyrometer*) is represented by the following Diagram:—

It consists of a box 13½ inches long, seven inches wide, and two inches deep, which contains the necessary wheel-work machinery. Upon the broad front of the box is placed the index-plate, which is nine inches in diameter, but which may be increased or otherwise at pleasure. There are two indices or hands; the longest indicates single revolutions of the Tread-wheel from one to one hundred; and the short hand marks off hundreds of revolutions from 100 to 10,000; the longest hand therefore performs one entire revolution when the shortest will have made but one division, or one hundredth part of its revolu-

* From γυρος a turn, and μετρον a measure.

tion. In using the instrument, the two hands are set together at the first point of the scale, viz. at 100, and after a period of Tread-wheel labour, the observer notes the point or division last passed over by the small hand, which in the Diagram is represented to be 4,100; to the number thus read is to be added the number of revolutions indicated by the long hand, viz. 64, and the sum of these two numbers, 4,164, will be the exact amount of revolutions made by the Tread-wheel during the interval of observation.*

The instrument being placed perfectly secure from the prisoners, and its dial plate being covered with a glass, it would be open to the inspection of the governor; and for the sake of satisfaction to all parties, the indices or hands of the instrument might be under lock, and the key remain in the possession of the magistrate. When the Governor is desirous of computing the mean velocity of the Tread-wheel for the register, he has first to ascertain the number of stepping-boards upon the Tread-wheel; then, observing by the indices the number of revolutions made in the hour or day, he has only to multiply one into the other, and divide the product by the time (in hours and minutes) during which the Wheel has been at work, and the quotient will be the rate in steps per minute at which the class has worked the wheel for the day. Suppose, for example, that the Tread-wheel has twenty-four steps upon its circumference, that in the course of twenty minutes the indices of the instrument shewed that the Tread-wheel had made forty revolutions, and that the Governor wished to ascertain the rate in steps per minute at which the prisoners had been working the wheel: multiplying 24 by 40, and dividing by 20 minutes, $\frac{24 \times 40}{20}$ the quotient will be 48, which is the rate required.†

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* Should this instrument receive the general adoption to which its importance appears to entitle it, Mr. Bate feels confident that it may be made smaller at a very moderate price, perhaps for £5., including a socket to connect the axis of the instrument with that of the Tread-wheel.

† The daily rates thus obtained in steps per minute, should of course lead to an accurate agreement with the number of revolutions shown by the in-

Although the instrument will not indicate in what proportions a class has been worked at the Wheel, by which the amount of individual labour is to be computed, yet as a check upon the rate of labour imposed, and as the means of satisfying any party concerned of the general labour performed in a Prison, the instrument must be considered as a most useful appendage to the Tread-wheel; at the same time that it perfects the method of registering the daily labour of the prisoners.

Thus provided with the means of measuring and of regulating the daily quantity of human labour, it is presumed that little danger will remain of the Tread-mill becoming an instrument of injury to the health of prisoners; or that the superintendence of this kind of labour, will be regarded with less interest by those who have the control and responsibility

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strument after a period of some days: this will be readily computed by the aid of the Sliding Scale. Suppose, after an interval of six days, the following entries occur in the Register under the head of "Mean velocity of the Tread-wheel," at a time when the wheel is at work ten hours per day, which it is an object to verify by the gyrometer:

1st Day.....	48	Eight-inch steps per minute.
2nd.....	50....	do..... do.
3rd	46....	do..... do.
4th	44....	do..... do.
5th	44....	do..... do.
6th	48....	do..... do.

Setting ten hours on the Sliding Scale to 48 steps, the first day's mean velocity, read off the number of feet to which the eight-inch index points; proceeding with the rest in the same manner, we have,

			Total General Labour per Day.
1st Day....	10 Hours....	48 Steps	= 19,200 feet.
2d.....	50.....		= 20,000
3rd.....	46.....		= 18,400
4th.....	44.....		= 17,600
5th.....	44.....		= 17,600
6th.....	48.....		= 19,200
			112,000

Which sum being divided by the number of feet the circumference of the Tread-wheel measures, suppose 16, will give 7000 as the number of revolutions which should be indicated by the gyrometer.

of gaols, than any other part of prison economy. To convert this excellent species of criminal employment into a source of injury to the health of those subjected to it, is undoubtedly as possible as it is to produce the same effect by a deficient allowance of food, or by any other improper treatment. But that the labour of the Tread-mill is (as has been recently alleged *) actually injurious to the human frame, is an assertion so contrary to the results of experience, that it will be only necessary to refer the reader to the official communications upon this subject, transmitted from the respective Prison authorities to the Secretary of State for the Home Department, which, together with the certificates received by the Committee, are inserted in the Appendix. Several of these documents, it will be seen, convey a decided testimony, that the employment has not only had no such pernicious effect (which was the direct object of inquiry to the respective authorities) but that it has actually proved beneficial to the health of the prisoners.

When compared with other kinds of mechanical employments in common use for men, that of the Tread-mill has this remarkable distinction, viz. that *weight and not force* is required of the

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* "Sir John Cox Hippesley, Bart. has addressed two Circular Letters to the Magistracy throughout the Kingdom, condemning, in the strongest terms, the introduction of Tread-mills into prisons, on various grounds, but principally on account of the labour being injurious to health. Since these Sheets have been committed to the press, a very satisfactory reply to these objections has been given by the Rev. W. Dent, Chairman of the visiting Justices of the House of Correction at Northallerton. The Committee have bestowed some pains in collecting the opinions of those whose *practical* knowledge renders them most competent to form an accurate judgment on the subject; and it will be seen, on reference to the Appendix, that the visiting Magistrates, Governors, and Surgeons of the several prisons, at which Tread-mills have been erected, unanimously concur in the expression of their approbation of this beneficial description of prison labour. The certificates printed in the Appendix, together with those which have been laid before Parliament, are quite decisive on the merits of the Tread-mill, and it may be regarded as a fortunate circumstance that Sir John Cox Hippesley has given so wide a circulation to his objections, as it has elicited many important facts, and given rise to much valuable discussion and useful inquiry."

labourer. The exertion therefore which the operation imposes, is moderate and uniform; and it is maintained throughout in an erect and unstrained position of the body. The Tread-wheels are in general constructed in the yards of the Prison, a plan which cannot be too strongly recommended, as being materially conducive to the health of the prisoners.*

The practice of employing females on the Tread-wheel has hitherto been limited to very few Prisons. The evidence which the Committee have been able to obtain relative to its effects on their health, affords just ground to be satisfied that, under the superintendence of the matron and surgeon of the prison, no prejudicial consequences will result; but care on the part of these officers is absolutely necessary. There are, however, to be found in every Prison, many descriptions of labour for women, which are much better adapted to female habits than employment at the Tread-mill. Its application, therefore, although highly useful to certain classes, and however safe and generally beneficial, would be far from being desirable to convicted females of every description, and would, of course, in some cases be objectionable.

The subject of diet becomes one of increased importance with reference to this description of labour. Soon after the introduction of the Tread-mill into the prisons already enumerated, the dietaries which had been previously in use with the former sedentary occupations, were in most or in all cases increased. It is however a matter of some regret to observe so much diversity prevailing in the allowances of food, both as respects quantity and quality, as will be seen by the list of dietaries inserted in the Appendix. On examining and comparing the contents of these dietaries, it is scarcely possible to refrain from the inference, that if the allowances of food in some instances

* Whenever the Tread-wheels are from necessity erected in rooms, particular care must be taken that a free ventilation be provided. At Northallerton it was thought proper on this account to substitute a strong trellice in the place of the closed boards in front of the prisoners, which has been found very advantageous.

are adequate and proper, in others there must be a danger of insufficiency. Some uniformity in this important particular is absolutely necessary. It is a subject which calls for serious consideration, and even legislative interference.

In proceeding to point out some of the advantages which the Tread-mill possesses as a means for the employment of convict prisoners, the first which presents itself is, its simplicity. No previous instruction is requisite to qualify any prisoner, on his first introduction, to perform his full part on the Tread-wheel:—no materials or instruments are put into his hands that are liable to waste or misapplication; and as neither practice nor ingenuity are in any way required, so muscular force is equally unnecessary in the operation. It thus happens that every individual employed, receives his due share of labour throughout the whole time; the lazy or the crafty being unable in the least degree to avoid their proper portion; and all perform their respective mechanical effect in the *service* to which the machinery is applied. This mechanical effect which a man produces by the application of a force equal to his own weight, is capable of being maintained at the Tread-wheel, for a longer period than he could support with any other machine; a circumstance which proves the superiority of this species of exertion for men, whose force whenever it is to be applied to machinery ought always to be employed to the greatest possible advantage to themselves as mechanical agents.*

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* An interesting memoir by Coulomb (whose reputation in this branch of mechanics is well known) was presented before the French National Institute about 20 years ago, "upon the quantity of force which men can exert in their daily labour according to the different modes in which their strength is employed." (Memoires de l'Institut. Tom. 2.) In this essay he details various experiments made on the employment of human strength at different kinds of labour, with the view of ascertaining the amount of force exerted in a day. From the results of his experiments it appears that "a man ascending a flight of steps, if by any means he could make use of his exertion by throwing his own weight so as to raise another weight," or perform any work thereby, he could exert a greater quantity of force for the day, than would be the case if employed at almost any other effective labour. "This observation," he adds

The power derived from human exertion at the Tread-mill, is at present chiefly applied to the operations of grinding corn and pumping water for the consumption of the Prison; the labour of the prisoners is, therefore, rendered of constant service in these establishments; and in some instances, considerable profit has accrued to the county in the year, from saving in the article of bread made from flour, the produce of the prisoners' labour.* At a few Prisons where the Mill has been some time established, the demand for its service has been very well maintained. At the Edinburgh Bridewell, machinery for cork-cutting has been connected with the Tread-wheels; and it is very probable that the ingenuity and enterprize of the present day, will lead to the introduction of various other operations, to which the power of Tread-wheels may be advantageously applied.

The regularity with which the prisoners' labour for the day may be maintained, and the facility with which the machinery

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" appears to me of the greatest importance in directing mechanics in the construction of machines intended to be moved by men."

It is remarkable how completely the Tread-wheel illustrates the truth of his problem; and a comparison of the amount of daily labour performed by a prisoner at the Brixton Tread-wheel, with the results of Coulomb's experiments, affords an interesting illustration of the justness of his conclusions. By Table 2nd, page 21, a prisoner at Brixton in summer exerts a force equal to that of raising his own weight over 15,000 feet in a day; which, being multiplied by the weight of his body (taken at 150 lbs.) equals 2,250,000 lbs. raised one foot per day. This result, for the sake of comparison, being taken at 10, the following will be the relative value of the several kinds of labour detailed in Coulomb's experiments, when compared with that performed by the prisoner at the Brixton Tread-wheel.

The daily labour of men employed in carrying loads up stairs, as $3\frac{1}{2}$ to 10
Ditto..... strongest man employed ..... as 4 to 10
Ditto..... at pile-driving..... as $2\frac{3}{5}$ to 10
Ditto..... stamping coin at the Paris Mint ..... as $1\frac{1}{4}$ to 10
Ditto..... drawing water out of wells..... as $2\frac{1}{4}$ to 10
Ditto..... working at the hand crank or spindle wheel, as $3\frac{1}{4}$ to 10
Ditto..... digging the ground with the spade..... as $1\frac{1}{4}$ to 10

* At Brixton the profit on grinding flour for the consumption of that prison and the county gaol in Horsemonger-lane, is estimated at 12 per cent.

is managed, are equally remarkable. The mechanism of the Tread-mill not being in general of a complicated nature, few interruptions arise for want of repairs to the machinery;* and if at any time the supply of work for the Mill should fall off, the regulating Fly removes the necessity of suspending or diminishing the labour of the prisoners at the wheels; to whom, therefore, any circumstance of that kind becomes a matter of no concern. The internal machinery of the Mill being inaccessible to the prisoners, requires the attendance of only one or at most two persons to manage a process, which is adapted to maintain in steady employment from ten to two hundred or more prisoners at one and the same time, and which can, without any inconvenience, be suspended and renewed as often as the regulations of the Prison may require.

This machine for the employment of prisoners is very well adapted to the modern principles of prison construction. The situation of the Tread-wheels may be easily laid down in a Prison design, so as to secure to the Governor a general inspection over the whole body of his prisoners at their daily labour. This is accomplished in a very complete manner at Brixton, where the arrangement of the Tread-wheels in the radiating yards (as shown in the diagram at page 3), enables the Governor, with the greatest convenience to himself, to view them all in action from his central station, without attracting notice; thus at all times of the day he may with the greatest ease satisfy himself of the state of his establishment as respects the general occupation of his prisoners.†

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* In a Letter from a Visiting Magistrate of the gaol at Hertford, (for whose valuable information and friendly services the Committee feel themselves under great obligation) it is stated "*No accident whatever* has occurred to our machinery; as a proof, the whole expense of the mill in all its parts, in replacing the tread steps, or now and then a brass bolt, &c. has been £8. 10*s.* in two years and a half."

† At this Prison the circular area intervening between the yards and the centre building, affords a very convenient passage for the watchmen or inspectors, who are in constant attendance during the hours of labour.

The classification of the prisoners according to offences, &c. may also be adhered to in the adoption of these Mills. The same wheel, or the same connected shaft, can be contrived to pass into distinct compartments or yards, in which the several classes may work in separate parties; and the power may be communicated from the Tread-wheels to the machinery of the Mill, wherever it may be situated in or about the Prison. At Brixton a Tread-wheel is erected in each of the ten yards, by which the classification of the prisoners is strictly maintained, and the inconvenience and risk of removing a set of prisoners from one part of the Prison to another are avoided.

Some vigilance will be necessary to put a stop to conversation amongst the prisoners whilst on the wheels; the method adopted at Gloucester Gaol in this respect is worthy of notice. "If any prisoner or prisoners are observed to be talking while on the Tread-wheel, they are deprived of their next turn for rest. Two officers are in constant attendance at the time."*

The average cost of these Machines, taken upon the number of prisoners each is calculated to employ, varies from £15 to £25, or £30 per head; which includes in general the expense of the whole Machinery, Mill-house &c. complete. Upon such a scale of expenditure, the investment of public money will not surely be deemed either improvident or unwarrantable, in securing to a House of Correction those permanent advantages which the Tread-mill affords: and the more so, when it is considered that little risk attends the disposal of the produce of these Mills, the demand for their service on hire being frequently such as to keep the Machinery in very good employ. In point of economy, it has already been stated that the saving from the consumption of flour ground by the labour of the Prisoners, proves an item of some importance in the annual accounts of the Prison; in

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* At the West Riding House of Correction, Wakefield, where an extensive range of Tread-wheels is nearly completed, an elevated passage passes immediately in front of the wheels, from which the inspecting officers are able to maintain a close watch over the prisoners on the wheels.

another respect, however, experience leads us to look for some economical effects from the adoption of these discipline mills, in the diminution of the number of commitments. This though difficult to prove, as the direct consequence of the introduction of the Tread-mill, is acknowledged in many instances to be very remarkable.*

As an occupation for convict prisoners, the labour at the Tread-mill is in no way calculated to lessen the value of those branches of prison regulation, which provide for their moral and religious improvement. On the contrary, it is believed, that the regular discipline to which the prisoner is subjected at this Machine, proves very generally of real service in that respect, by *impressing* some sense of moral consequences on the minds of the hardened and depraved criminal; at the same time that the means used are such as connect useful mechanical labour with strict discipline and healthy exercise. The sentence of the law, from the difficulties in providing the means of hard labour, had long continued an idle denunciation against the prisoner at the bar of our criminal courts. A sentence of hard labour is now however capable of being strictly carried into effect; and the numerous testimonies which have reached the Committee, warrant the assertion that the Tread-mill fulfils the object which the law has in view, to the increasing satisfaction of the Public at large.

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* The following statement of the number of criminal indictments tried at the Surrey Assizes for the last three years, indicates a remarkable diminution for the year, (1822) a period during which, the fame of the Tread-mill became generally known; the Machinery was completed only in the latter part of the summer of 1821.

1820....	Lent Assizes....	125.....	Summer Assizes.... 93
1821.....	Ditto.....	190.....	Ditto 77
1822.....	Ditto.....	90.....	Ditto 46

Of the number 190 there were 42 indictments for forging bank notes, which on account of the change in the currency must be excluded from the calculation.

Appendix.

COPIES OF COMMUNICATIONS

TO THE

SECRETARY OF STATE FOR THE HOME DEPARTMENT,

RESPECTING THE USE OF

TREAD-WHEELS,

IN GAOLS OR HOUSES OF CORRECTION.

Ordered, by the House of Commons, to be printed,
10*th of March*, 1823.

TO WHICH ARE ADDED

COPIES OF CERTIFICATES

TRANSMITTED TO THE COMMITTEE ON THE SAME SUBJECT.

APPENDIX.

Copy of a Letter, addressed, by Mr. Secretary PEEL'S *directions, to the Visiting Magistrates of the several Gaols and Houses of Correction, where Tread-wheels have been established; dated Whitehall, January* 18, 1823.

Gentlemen,

I AM directed by Mr. Secretary PEEL to request, that you will inform him, how long the Tread-wheel, which he understands to be in Prison, has been in operation; and whether you have found any injurious effects produced by it, on the bodies or legs of the prisoners, who have worked thereat. I have, &c. (Signed) H. HOBHOUSE.

BERKSHIRE.

Sir, *Reading, January* 25, 1823.

WE beg leave to acknowledge the receipt of your letter, and to state for the information of Mr. Secretary Peel, that the Tread-mill in the House of Correction at Reading, has been in constant use from the 25th of November last, to the present time, employing on an average about thirty-five or forty prisoners per day, and that hitherto we have not discovered that any injurious effects whatever have been produced upon the bodies or legs of the prisoners by that species of labour.

We have the honour to be, &c. &c. &c.

(Signed) *Robt. Palmer*, *H. E. St. John*,

H. Hobhouse, Esq. Visiting Magistrates at Reading.

Sir, *Holme Park, Reading, Feb. 19th*, 1823.

I BEG leave to enclose the opinion of the medical gentlemen in attendance at the gaol, relative to the health of prisoners employed at the Tread-mill, which I trust will prove satisfactory.

I have the honour to be, &c.

(Signed) *Robt. Palmer*, Visiting Magistrate.

Dear Sir,

IN reply to your letter directed to Mr. Workman, I beg leave to inform you that it is his opinion as well as my own, that no injurious effects have

been produced on the bodies or limbs of the prisoners employed in the Tread-mill, since the commencement of its operation. I remain, &c.

(Signed) *John Bulley*, Surgeon to the Goal.

Sir, *Reading, Feb. 18th*, 1823.

I SHOULD have answered your letter of yesterday had I not waited for Mr. Bulley's opinion respecting the men employed in the Tread-mill: I have been in attendance almost daily at the gaol, and have never heard any of the men complain of the labour; in short, I think they were never in a more healthy state than they are at the present time.

I beg leave to apologize for not answering your letter earlier, and remain, &c.

(Signed) *Maurice Workman.*

Sir, *Holme Park, Reading, March* 6, 1823.

HAVING had the honour of transmitting to you a very satisfactory account of the health of the prisoners employed at the Tread-mill in Reading gaol, and the surgeon's certificate to that effect, I am sorry now to have to communicate that on the very next day after I had made the above report, an accident occurred to one of the prisoners while at work upon the wheel. I have thought it right to obtain the surgeon's certificate relative to this case, and to transmit it to you, in order to check any incorrect statement that might be made of the circumstance.

This is certainly the first accident that has occurred in the gaol at Reading since the Tread Mill has been established. I have, &c.

(Signed) *Robt. Palmer*, Visiting Magistrate.

Reading, March 5, 1823.

THIS is to certify, that William Strange is afflicted with a rupture, which took place whilst working on the Tread-mill by a violent fit of coughing, and in all probability would have happened independent of the exertion on the mill.

(Signed) *John Bulley*, Surgeon to the Gaol.

BEDFORD.

Bedford New House of Correction, January 9, 1823.

I AM of opinion that the labour of the Tread-mill in this House of Correction, so far from being detrimental to health, tends to keep the Prisoners in better health than they would be without employment.

(Signed) *C. Short*,
Surgeon to the County Gaol and New House of Correction.

THE labour of the Tread-mill is, in my opinion, quite sufficient for con-

stant employment, but not severe, or in any way injurious to the health of the Prisoners.

(Signed) *John Tregenza*,
Bedford, Jan. 9, 1823. Governor of the New House of Correction.

As far as our experience enables us to form an opinion, the labour of the Tread-mill tends rather to preserve good health among the prisoners, than in any way to injure it. (Signed) *G. H. Bowers*,
Chaplain to the County Gaol and
Bedford, Jan. 9, 1823. New House of Correction.

BUCKINGHAMSHIRE.

Sir, *Aylesbury, January* 25, 1823.

In answer to your letter of the 22d instant, requesting a communication from us respecting the Tread-mill in this gaol, for the information of Mr. Secretary Peel, we have the honour to acquaint you, that the Mill has been in operation from January 1819, and that the labour has been invariably attended with salutary effects; nor has any instance of injury to the bodies or legs of the men arisen from their employment in it.

On reference to the reports, we find that the health of the prisoners has never been so good as since the introduction of this kind of labour.

We have the honour to be, &c.

(Signed) *John Dashwood King*, *C. R. Ashfield*,
Justices, Visitors of the Gaol and House of
H. Hobhouse, Esq. Correction at Aylesbury.

Aylesbury, February 22, 1823.

I do hereby certify, that the prisoners in the Gaol at Aylesbury, in the county of Buckingham, are in general healthy and free from any epidemical disease, which I attribute to the employment on the Tread-mill, affording much exercise and conducive to their general health, without any inconvenience to the bodies or limbs of the prisoners.

(Signed) *William Hayward*, Surgeon.

CAMBRIDGESHIRE.

Sir, *Cambridge, January* 28, 1823.

In reply to the letter addressed to me, at your desire, by Mr. Hobhouse, requesting to be informed how long the Tread-wheel has been in operation in the Town Gaol of Cambridge, and whether any injurious effects have been found by it, I have the honour to acquaint you that the Tread-wheel has been in use at the Town Gaol from the 2d day of October last, without producing any injurious effects on the bodies or legs of the prisoners, but has

on the contrary, had the most beneficial effect on the health of the prisoners who work thereat. I have, &c.

(Signed) *John Ingle*, Mayor.

Mr. Secretary Peel, &c. &c. &c.

Sir, *Cambridge, February* 17, 1823.

I AM of opinion that the healths of the prisoners have been materially improved by their working at the Tread-mill.

I have never seen one case where the limbs or the bodily health have been affected. I am, &c.

(Signed) *A. S. Abbott*, Surgeon.

Sir, *Cambridge, February* 6, 1823.

IN answer to the inquiries of Mr. Secretary Peel, we beg leave to inform him, that the Tread Mill in the County House of Correction at Cambridge, has been in full operation for one whole year, from the 10th of January last, without interruption.

We have not found any injurious effects produced upon the bodies or legs of the prisoners by the labour; and the surgeon is of opinion, that so far from being hurtful, it is beneficial to the general health of the prisoners. There are several men who have been at work in the Wheel from the commencement (about 56 weeks:) they are now in good health, and as active as when they first came. We are, &c.

(Signed) *James Hicks*, *Francis Pym, junr.*
Alex. Cotton, *Wm. Leworthy*,
Visiting Magistrates.

H. Hobhouse, Esq.
&c. &c. &c.

Cambridge, January 18, 1823.

THIS is to certify, that the labour on the Tread-mill in the County Gaol has not been found injurious to the health of the prisoners. The mill has been at work without interruption for one whole year.

(Signed) *Francis Pym, junr.* *Wm. Leworthy*,
Visiting Magistrates.
John Okes, Surgeon to the Gaol.
Robert Orridge, Governor.

DEVONSHIRE.

Sir, *Exeter, February* 14, 1823.

IN reply to your letter with which I have been honoured, I beg leave to state, that not any case has occurred in the Devon House of Correction, from the Tread-mill discipline, either to the bodies or legs of the prisoners: I do not conceive any injury to the latter can arise, except from wilful negligence of the individual. I am of opinion, which has been confirmed by inquiry,

that after a few days work on the Tread-Mill, the muscles of the legs, thighs, and back, becoming habituated to it, the employment on the Mill ceases to be a punishment; what effect on health the Mill may produce in the summer season, I cannot now pretend to judge, but I do not anticipate any, as exposure to the air and regular exercise are the best preservatives of health. The diseases generally existing at different seasons of the year in the House of Correction, are fewer (most frequently created there and kept up, from over crowded and ill-ventilated cells) debility for want of food before admission, venereal complaints, and itch. I remain, &c. &c.

(Signed) *Samuel Luscombe*, Surgeon.

To the Chairman of the Devon Epiphany Quarter Sessions, January 20, 1823.

Sir, *Devon County Bridewell.*

In answer to the inquiries given me this morning as to the injurious effects, if any, and of what kind, produced on the bodies or legs of the prisoners who have worked on the Tread-wheel, erected in the House of Correction of this county, of which I have the government, I have to certify to the court, that the Tread-mill has been in full operation ever since the last Midsummer Sessions, and on an average from seventy-five to eighty prisoners have been daily employed on the Wheels, the proportion of females being very small, not amounting to more than ten or twelve at any time, and generally not exceeding six or eight. The male prisoners, when at work, are three-fourths on the Wheels, and one-fourth at rest; the females, one half on the Wheel, and the other half at rest; and during the six months the Mill has been at work, I have never heard of one prisoner, male or female, receiving any injury, either in their limbs or general health, and as far as I am capable of forming a judgment, I consider the labour at the Tread-mill not as injurious, but conducive to the health of the prisoners. I am, &c. &c.

(Signed) *William Cole*, Governor.

DORSETSHIRE.

Sir, *Kingston, February 9, 1823.*

I have the honour, on the part of the Visiting Magistrates of the Gaol and House of Correction, at Dorchester, to report to you, in answer to your letter of the 7th instant, that the Tread-mill has been in operation, as to the male prisoners, since the 12th of January, 1822, and that no injurious effects have been produced by it, on the bodies or legs of the male prisoners who have worked at it.

They further report, with regard to the female prisoners who have been so employed about five months, that they have occasionally been subjected to *certain complaints*, which the surgeon of the gaol has attributed to the working at the Wheel, and that in such cases the women so affected, have been taken from the work till those complaints have subsided. I have, &c.

(Signed) *W. M. Pitt.*

Sir, *Castle, Dorchester, December* 26, 1822.

I HAVE the honour to inform you, in answer to your letter of the 24th December, that no ill effects have been produced on the muscles of the legs of those prisoners who have been employed on the new principle Mill now in use. I have, &c.

(Signed) *R. W. Andrews.*

Gentlemen, *Dorchester, Dorset, February* 17th, 1823.

I HAVE the honour to report, in answer to your inquiry respecting the effects of the Tread-mill upon the persons of the prisoners confined in the Dorchester gaol, that I have not observed any injurious effects whatever, either on the bodies or limbs of the male prisoners who have been so employed, but that a few of the female prisoners have been subjected to certain complaints incidental to women, rather more than usual, in my opinion the consequence of the exertion and exposure to cold. I have, &c.

(Signed) *John Birt Davies*, Surgeon,
Acting for Christ. Arden,
Surgeon to the Dorset County Gaol.

The Visiting Magistrates
of the County Gaol, Dorchester.

DURHAM.

Sir, *Durham Gaol, January* 31, 1825.

IN answer to your letter of the 22d instant, we beg to observe, the Tread-mill has been in operation at this prison from the month of April last, and its effects have not only been found salutary in the way of correction, but unattended with any inconvenience or injurious consequences to the persons employed in working it. The prison has been regularly visited, and no complaint has ever been made, either to the Visiting Magistrates or Governor of the Gaol, that this employment at the Wheel has occasioned any cramp or contraction in the limbs. It may be also proper to notice, that we have not thought it advisable to employ females in working the Tread-wheel.

We have the honour to be, &c. &e. &e.

(Signed) *Edward Davison*,
Thomas Hopper,
W. N. Darnell.

The Right Honourable
the Secretary of State, H. D.

February 24, 1825.

HAVING regularly attended the prisoners employed on the Tread-mill attached to this prison, since its commencement in April last, during which period it has been in constant operation, I am confident, that not any of the prisoners have sustained the slightest injury either in their limbs or bodies from its employment; and I am of opinion, if persevered in with prudence, and not too long continued, no serious effects are to be apprehended from its use.

(Signed) *William Green*, Surgeon, &c.
to the Gaol and House of Correction, Durham

ESSEX.

Sir, *Chelmsford, February* 5, 1823.

We beg leave to state, in reply to a letter addressed to us by Mr. Hobhouse, dated the 18th ult. for your information, that the Tread-wheel erected in the House of Correction in this town, has been in operation since the first of October last; and that (after inquiry made of the medical attendant and the Governor) we do not find that, hitherto, any injurious effects have been produced by the use of it upon the bodies or legs of the prisoners employed upon it.

The medical attendant states to us that he knows of no instances of injury; but that he considers the labour on the Wheel has been found to be generally salutary to the health of the prisoners. We have, &c.

(Signed) *T. G. Bramston, J. R. S. Phillips, John J. Strutt, B. H. Bridges, John Disney, C. T. Tower. J. M'Lachlan,*

GLOUCESTERSHIRE.

Sir, *Gloucester County Prison, January* 27, 1823.

In reply to the queries contained in your letter of the 22d instant, I have to inform you, that the Tread-wheel erected in the Gloucester Penitentiary, has been in operation for three weeks; and I have the authority of the Surgeon of the prison for stating, that no injurious effects whatever have hitherto been produced on the bodies or legs of the prisoners, who have been employed in working it. I have the honour to be, &c. &c. &c.

(Signed) *S. Commelin,*
Visiting Magistrate of the County Prison.

Sir, *Horsley House of Correction, January* 1823.

In reply to your letter of the 22d of this month, the grinding mill worked by a Tread-wheel erected at this House of Correction, was completed on the 17th of last month. It has been in full operation for the last twenty days.

Eighteen male prisoners are employed to work it, twelve on and six off the Wheel, from eight A. M. to half past six P. M. one hour and a half being allowed them for meals out of that time. Each prisoner in succession is twenty-four minutes at work, and twelve minutes at rest.

We have not found, nor, from the experience we have had, do we anticipate any injurious effects on the bodies or legs of the men employed; nor has a single complaint been made against this description of hard labour by any of the prisoners. We have the honour to be, &c.

Henry Hobhouse, Esq. (Signed) *P. B. Purnell,*
one of His Majesty's Under Secretaries of State; *Peter Hawker.*
&c. &c. &c.

HERTFORDSHIRE.

Sir,

We, the undersigned, Visiting Magistrates of the Gaol and House of Correction at Hertford, certify, for the information of Mr. Secretary Peel, that the Tread-wheel has been in operation daily, (Sundays excepted,) from the 1st August 1820, to the present time, and that no injurious effects whatever have been produced by it either on the bodies or legs of the prisoners who have worked thereat.

(Signed) *H. Ridley*, D.D. *Thomas Lloyd*, Clerk.
W. Baker, *William Dent*.
Culling Smith.

I, the undersigned, Surgeon and Apothecary to the Gaol and House of Correction in the county of Hertford, do hereby certify, that from the 1st of August 1820, the day on which the Tread-wheel was put into operation, not a single prisoner has ever suffered, either in his body, limbs, or general health, in working it. (Signed) *Thomas Colbeck*, Surgeon, &c.

Hertford, January 4, 1823.

We, the undersigned, do hereby certify, that since the Tread-mill in the House of Correction at Hertford was first set to work in August 1820, not a single prisoner has ever suffered in his health from being employed upon it; and, so far from the employment being detrimental to the health of the prisoners, we are of opinion that it contributes essentially to preserve it.

(Signed) *Thomas Lloyd*, Visiting Magistrate. *Thomas Colbeck*, Surgeon.
F. W. Franklin, Chaplain. *W. P. Willson*, Gaoler.

LANCASHIRE.

Sir, *Lancaster, January* 28, 1823.

In answer to your inquiry respecting the Tread-mill system of labour, we beg leave to inform you, that the Mill has been used since the 25th day of October last, for the purpose of pumping a supply of water for the use of the prison. We cannot find that any injurious effects have been produced on the bodies or legs of the prisoners, except in the case of James Timperley, who has had a degree of inflammation in his groin, which the Surgeon believes to have arisen from the unsound state of his body, he having recently had the venereal disease. The rest of the prisoners thus employed, nine in number, appear healthy, and make no complaint.

We have the honour to be, &c.

(Signed) *Edmund Hornby*, V. J. P.
Richard Atkinson, V. J. P.

H. Hobhouse, Esq.
Under Secretary of State, &c.

Gentlemen, *Lancaster, February* 19, 1823.

In reply to your inquiry, as to the effect of the Tread-mill system of labour on the health of the prisoners so employed, I have to observe, that where the men are free from rupture or disease in the groin, either from syphilis or serophula, no ill effects have ensued, either on their bodies or limbs, nor do I apprehend any injurious consequences are likely to arise from it; for on examining those men who have worked longest at the Wheel, I have found them in perfect health, and, notwithstanding their expression of dislike to the work, have admitted that they have gained weight since they have been so employed. I have the honour to be, &c.

The Visiting Magistrates of Lancaster Castle. (Signed) *John Smith.*

LEICESTERSHIRE.

Questions for inquiry, as to the prisoners suffering any ill effects from working in the Wheel at the House of Correction for the county of Leicester.

1. The time the Mill has been at work?—About three years and a half.

2. The average number of men employed in it for any given time?—Not more than 50, or less than 20.

3. Whether any disorder in the legs has been attributable to this mode of employing prisoners?—The Governor never knew of any (the least) ill effects to be produced on the legs of the prisoners employed by working at the Wheel.

The Surgeon confirms the above statement.

(Signed) *W. R. Tyson, J. King,*
Visiting Justices.

MIDDLESEX.

Sir, *Sessions House, Clerkenwell, February* 3, 1823.

I am directed by the Visiting Justices of the county of Middlesex, in answer to your letter of the 18th ult. to inform you, that the Tread-wheel in the Cold Bath Fields prison has been in operation about seven months, and has not produced any injurious effects on the bodies or legs of the prisoners who have worked thereat. I have the honour to be, &c. &c.

H. Hobhouse, Esq. &c. &c. (Signed) *Thomas Stirling.*

Cold Bath Square, February 24, 1823.

During the eight months the Tread-mill has been employed at the House of Correction, Cold Bath Fields, I have never in any one instance known any ill effects produced on the frame of either the men or women who have worked on the Wheel, nor can I tell whether any are likely to follow upon this kind of discipline.

(Signed) *Thomas Webbe,* Surgeon.

NORFOLK.

Sir, *Swaffham, January* 25, 1823.

Being one of the Visiting Magistrates of the Swaffham Bridewell, and resident upon the spot, and having shown your letter of the 18th instant to such of the other Visiting Magistrates as I have seen, I send you the following answer to it, with their concurrence.

The Tread-wheel has been in use here about four months, and during that time no injurious effects whatever have been experienced to the health of the prisoners; indeed, we finished our report to the Sessions last week, with observing, that "though there had been in general a large number of prisoners, they have been very healthy; which may, perhaps, in some measure be owing to the regular exercise on the Tread-wheel." We have had about 70 prisoners during that time.

I have also seen the medical attendant on the Bridewell, and his opinion likewise is, that the exercise of the Tread-wheel is very salutary. I am, &c.

H. Hobhouse, Esq. (Signed) *Wm. Yonge.*

PEMBROKESHIRE.

Sir, *Haverfordwest, January* 24, 1823.

In reply to a letter, of the date of January 22, in regard to the operation of the Tread-wheel erected in our county gaol, we have the honour to inform you, for the information of Mr. Secretary Peel, that the Tread-mill has been in full employ since the 2d day of July 1821, and that no injurious effects whatever have been produced either on the bodies or legs of the prisoners worked thereat. We have the honour to be, &c. &c.

(Signed) *Thos. Martin*, *H. D. Jones*, M.D.
G. Harris,
Visiting Magistrates of the County Gaol and House of Correction for the County of Pembroke.

Having been applied to by the Visiting Magistrates of the gaol of the county of Pembroke and town and county of Haverfordwest, for my opinion, as to the effects produced upon the bodies and limbs of the prisoners employed on the Tread-wheel, since its being in operation;—

I do hereby certify, that from a careful attention to the prisoners employed, I can safely declare, that I have not seen a single instance of any bad effects produced by the Tread-wheel on the bodies or limbs of any one of them.

Dated at Haverford West, this 22d of day of February 1823.

(Signed) *William Harris*, Surgeon.

Haverfordwest, January 9, 1823.

I hereby certify that, as one of the Visiting Magistrates, I have often occasion to visit the Gaol and House of Correction of the County of Pembroke,

and of the Town and County of Haverfordwest. I have made many inquiries on the subject, but in no instance have I had any reason to think that the health of any prisoner has suffered from the exertion of the Tread-mill.

(Signed) *G. Harries*, M. D. Visiting Magistrate.

I, James Thomas Clerk, Chaplain to the Gaol and House of Correction of the County of Pembroke and Town and County of Haverfordwest, in attending my duties amongst the prisoners, do certify, that I never had any cause to believe, that the health of any of the prisoners was affected by the labour of the Tread-mill.

(Signed) *James Thomas*, Chaplain.

I, certify as Surgeon of the Gaol and House of Correction of the County of Pembroke, and of the Town and County of Haverfordwest, that I have never known any individual, put under my care for ill-health, induced by hard-labour in the Tread-mill.

(Signed) *William Harris*, Surgeon.

Castle Gaol, Haverfordwest, January 9, 1823.

I, William Jones, Governor of the Gaol and House of Correction of the County of Pembroke, and of the Town and County of Haverfordwest, do certify, that I have in no instance known of the health of any prisoner having suffered by the labour of the Tread-mill. My instructions from the Visiting Magistrates are to report any prisoner complaining of being unwell, either in the County Gaol or House of Correction, to the surgeon for examination, as to whether his illness is real or pretended, and to attend strictly to the orders given by him. I can however speak very confidently, that I have never been able to trace the indisposition of any prisoner to the effects of labour in the Tread-mill.

(Signed) *William Jones*, Governor.

Milford, January 10, 1823.

I, the undersigned being one of the Chairmen of the Quarter Sessions of the County of Pembroke, and of a Committee of Magistrates appointed for the purpose of improving the Gaol and House of Correction of the said County, do certify my firm conviction, that the labour of the Tread-wheel has been beneficial to the health of the prisoners who have worked at it.

(Signed) *H. Leach.*

SUFFOLK.

Sir, *Bury St. Edmunds, February* 9, 1823.

I HAVE the honour to inform you, that the Mill in question, the first of the kind ever erected, has been in use since November 1819; that the average number in constant work since that time, may be reckoned at fifty; the

number at present, and for some considerable time past, is eighty-four, which it was originally calculated to employ.

I have further to state, that having been a Visiting Magistrate for many years, long prior to the erection of the Mill, and residing but a short distance from the gaol, I have watched, with much care, the operation and effect of the Mill, and I consider it to answer the intended purpose most perfectly; and I have not myself the least reason to believe, nor have I ever heard from the governor or the surgeon of the gaol, or from any other person, that the working on the Tread-mill impaired, in the smallest degree, the health or physical powers of the prisoners so employed, or that they sustained the least injury, either in their bodies or legs.

I sent to the surgeon of the gaol for his report on the subject, which I have enclosed. I have the honour to be, &c.

(Signed) *J. Benjafield*, Visiting Magistrate.

Sir, *Shire Hall, Ipswich, February* 15, 1823.

THE Tread-mill in the County Gaol of this place has been worked rather more than a twelvemonth, during which period no instances have occurred in which such work has been found productive of any injurious effects to the bodies or legs of the prisoners employed upon it. The surgeon has been strictly examined by the magistrates as to his opinion upon the subject, and he decidedly pronounces, that it is by no means detrimental to their health. I have, &c. &c.

(Signed) *Chas. Berners.*

To the Visiting Magistrates of the Gaol and House of Correction, at Ipswich, in the County of Suffolk, February 15, 1823.

HAVING received your commands for a certificate of the effects produced by the Tread-mill on the body and limbs of the prisoners working on the said wheel now in use in the House of Correction;—

I hereby certify, that during the fifteen months the Tread-mill has been employed in the above Prison, I have never witnessed a solitary instance of its injurious effects; on the contrary, by a just application, as directed by myself and gaoler, I have invariably found the employment on the wheel to be beneficial, inasmuch as it has appeared to me that the health of the prisoners has been materially increased by it.

(Signed) *George Stebbing*,
Surgeon to the County Gaol and House of Correction at Ipswich, in Suffolk.

Ipswich, January 4, 1823.

WE hereby certify, that the Tread-mill has been in use as a means of hard labour to the convict prisoners sentenced to such punishment in the County Gaol and House of Correction at this place for upwards of twelve months

past; and are of opinion that this particular kind of labour is in nowise hurtful to the health of the prisoners employed, but on the contrary that it is conducive to their general health.

(Signed) *R. Harland*, *John Gibson*, *Thomas Mills*.
Cha. Berners, *Geo. Capper*,
County Magistrates.
George Stebbing, Surgeon.
John Robt. Turmey, Chaplain.
Samuel Johnson, Governor of the Gaol.

Hatter Street, Bury St. Edmunds, February 28, 1823.

I hereby certify, that I have constantly attended the Gaol at Bury as Surgeon, ever since the erection of the Tread-mill, which is now upwards of three years and a half, and during this time I have never met with a single instance of injury arising from that mode of employment: and I am further of opinion that no injurious effects are likely to arise, as the muscles of the lower part of the body are not brought into any unnatural action, and the equilibrium is preserved by a hand-rail.

(Signed) *George Hubbard*, Surgeon to the Gaol.

I John Orridge, keeper of his Majesty's jail at Bury Saint Edmunds, in the county of Suffolk, do hereby certify that the Tread-mill has been constantly at work since the month of November 1819, and not less than 50 men employed upon an average; and I have never yet heard that it has injured the health or physical powers of any one man, either in confinement or since their discharge.

February 28, 1823. (Signed) *John Orridge*.

SURREY.

Sir, *House of Correction, Guildford, January* 9, 1823.

As chairman of the committee of Visiting Magistrates, I think I cannot better reply to your inquiry, than by copying an extract from the report of that committee to the Epiphany sessions, and by enclosing a letter from Mr. Jackson, the surgeon, in answer to my letter enclosing them a copy of Mr. Peel's request. The wheel has been in operation since the beginning of last August.

Copy Extract of Report to Quarter Sessions.

The reports of the surgeon are highly satisfactory, and induce your Committee to believe, not only that the situation of this prison is particularly healthy, but that the system of discipline established in it does not appear to be productive of any disease or infirmity to the prisoners subject to it.

(Signed) *G. Holme Sumner*, *Rev. Chas. Stewart*,
Francis Wightwick, *Wm. Holme Sumner*,
Rev. G. W. Onslow.

Sir, *House of Correction, Guildford, January* 21, 1823.

In reply to your letter of yesterday, I beg leave to say, that during the time the Tread-mill has been in existence, I have not witnessed a single case of sickness on the part of the prisoners that could be attributed to its use, nor can I conceive that any injurious effects are likely to be produced on the bodies or legs of those who are employed at it.

The prisoners are universally in good health, with the exception of three men who were labouring under disease at the time of admission.

I am, &c.

G. H. Sumner, Esq. (Signed) *Edw. Jackson*, Surgeon.

Sir, *Streatham Park, December* 30, 1822.

On Friday last I visited the House of Correction at Brixton Hill, and particularly inquired of the governor, Mr. Green, who has been there in that office ever since the last Epiphany session, whether he ever knew or heard from any of the prisoners under his care, that the labour of the Tread-mill had affected their limbs or muscles in any way, so as to be injurious to them; and his reply was prompt and distinct. He said he never heard of such a complaint, or of any complaint of the like kind from any one of them; he stated, that he recollected asking a woman who had been at the wheel for a month awhile ago, and who went to work with a rheumatic complaint, how she felt when she went away; and she replied, that her rheumatism was completely cured.

I now enclose the copy of a letter from Mr. Gardiner, who has been the surgeon to the House of Correction at Brixton ever since its establishment, and who is well known to be a man of very superior medical attainments, and of a remarkably cool and careful judgment, which contains his deliberate opinion upon the question. I am, &c.

(Signed) *Thomas Harrison.*

Sir, *Streatham, December* 28, 1822.

In answer to your inquiry, whether the disease, called varicose veins, ever occurred amongst the prisoners at Brixton House of Correction, in consequence of their labour at the Tread-mill, I have to state, that ever since the Mill has been established in October 1821, no such disease has ever been observed. Indeed, as far as my observation goes, I should conceive that such a disease, instead of being produced, would much more probably be prevented, inasmuch as, from the kind and degree of exercise made use of, the circulation in the limbs being thereby promoted, morbid distension of the vessels will be less likely to take place. I am, &c.

(Signed) *Wm. Gardiner.*

To Thomas Harrison, Esq.
Chairman of the Quarter Sessions in the county of Surrey.

We the undersigned Visiting Magistrates of the House of Correction at Brixton Hill, do certify that the Tread-mill was first set at work there in the month of October 1821, and has continued at work until the present time; and that we are not aware of any instance in which the health of the prisoners employed thereon has been injured thereby.

(Signed) *G. Holme Sumner*, *James Laing*,
Thomas Harrison, *Thos. Lett.*
February 21, 1823. *Frs. Wightwick*,

SUSSEX.

Sir, *Lewes, February* 11, 1823.

In reply to Mr. Hobhouse's letter of the 28th ult. we have to state, that the Tread-wheel was first set up in the House of Correction here, about the end of June last; but owing to some defects in the machinery, which required alteration, it could not be brought into effective operation until about 17th September; since that time, about thirty-two prisoners have been regularly employed upon it, and there is no reason to imagine, that any injurious effects either of a general or local nature have been or are likely to be produced by it. The state of the gaol in general is exceedingly healthy, and the prisoners employed in this species of labour are, at least, equally healthy with the other description of prisoners. In confirmation of this opinion, we subjoin a report from Mr. Roberts, the medical attendant on the prisoners, upon whose skill and judgment we have every reason to rely.

We have the honour to be, &c.

(Signed) *George Shiffner*, *James H. Slater*,
T. Partington, *Henry Shiffner*,
Visiting Magistrates of the House of Correction at Lewes.

I do hereby certify, that no case of general disease or local accident has resulted from the use of the Tread-mill in the House of Correction since its erection, either in a medical or surgical point of view. I would also observe, that had any such accident or disease arisen, it must have passed under my observation and notice, since a medical visit is paid every day, without exception, and every, even the slightest accident, is reported.

(Signed) *Avery Roberts*,
Lewes, January 28, 1823. Surgeon attending the prisoners.

YORKSHIRE, NORTH RIDING.

Sir, *Crosbey, near Northallerton, January* 30, 1823.

I have laid before the Visiting Justices, Mr. Hobhouse's letter of the 18th instant, and I am authorized by them to inform you, that the Tread-wheel in the House of Correction at Northallerton, was first brought into use at Michaelmas 1820, and that so far from any effects injurious either to the

health or limbs of the prisoners having resulted therefrom, we are of opinion that their general health is improved, and that no symptoms of any local affection have ever appeared. I have the honour to be, &c.

The Right Honourable (Signed) *Wm. Dent*,
the Secretary of State, &c. Chairman of the Committee.

Since the operation of the Tread-wheel, at the House of Correction at Northallerton, have you observed any injurious effects produced either upon the bodies in general, or the limbs in particular, of the prisoners employed thereon?

And what is your opinion as to the effect of this labour upon the general health of the prisoners?

To W. B. Dighton, Esq. (Signed) *Wm. Dent*, Chairman.

To the Rev. Wm. Dent, Chairman of the Visiting Committee.

Sir, *Northallerton, February* 26, 1823.

In answer to the annexed queries, I request to inform you, that the Tread-mill has been in operation at Northallerton for two years and upwards, and during that time I have not observed any injurious effects whatever produced by it, and that upon the whole, my opinion is, most decidedly, that this kind of labour is beneficial to the health of the prisoners.

I have the honour to be, &c.

(Signed) *W. B. Dighton*, Surgeon.

EDINBURGH.

My Lord, *Middleby Street, Newington, February* 19, 1823.

In obedience to your lordship's directions, I have communicated with Mr. Law, surgeon to Bridewell, regarding the effects produced upon the prisoners by working upon the Tread-wheels, and I have now the honour to enclose his reply, in which two slight cases are noticed, as the *only* two occurrences that have taken place since the machine was erected.

With respect to the first of these, that of a boy who alleged the labour had made him spit blood, as nothing was ever heard of it, either before or since the time when he called Mr. Law, I conclude the allegation was merely a pretence to get free of work; and in regard to the *second*, that of the man who had got his ancle bruised, I can state most decidedly that the accident had no connection with the labour; but was wholly owing to his own temerity, in passing over the wheel at a time when the ordinary covering had been removed for the purpose of some repair; and no such accident can, by any possibility, happen to the prisoners while in the act of working upon the wheel.

I have, &c.

The Right Hon. the Lord Provost of Edinburgh, *D. Murray*.
&c. &c. &c.

Sir,

In answer to your note regarding the effect of the Tread-wheel on the health of the prisoners in Bridewell, I have to state that once only a boy called to me to say that it had made him spit blood; but as I was aware how ready such people are to complain, in order to get free of labour, I purposely passed him over, well knowing that if he became seriously ill, I, or one of my assistants, should soon hear of it. We heard no more of his spitting of blood.

Within these few weeks, when I happened to call about other business, a man was brought to me who had got his leg bruised, as he said, in coming off the wheel. The man did not complain of the accident as any thing necessarily connected with the nature of the labour, and I was led at the time to conclude that it was produced by his own carelessness.

These, to the best of my recollection, are the only two occurrences that have taken place since the machine was erected.

I remain, &c.

Mr. Murray. *James Law*, Surgeon to the Bridewell.

DIETARIES

At present allowed to Prisoners employed at the Tread-mill.

LANCASTER.—One quart of oatmeal porridge morning and evening; one pound of wheaten bread per day; a quarter of a pound of cheese weekly; a quarter of a pound of salt weekly; one pound and a half of potatoes daily; one quart of stew on Fridays; and on Sundays, half a pound of boiled beef without bone, with one quart of broth.

LEWES House of Correction.—One pint of soup, one pound and a half of bread per day.

CHELMSFORD House of Correction.—One pound and three-quarters of bread, two ounces of cheese, and one quart of beer per day.

BURY.—One pound and three-quarters of bread made of second flour, and a quart of small beer per day; with one pound of Suffolk cheese per week; and three-quarters of a pound of meat for Sunday dinner.

COLD-BATH FIELDS House of Correction for Middlesex.—Three days in the week, six ounces of boiled meat, one pint of gruel, and one pound and a quarter of bread;—three days in the week, one pint of gruel, one pint of soup made from the boiled meat of the preceding day, with one pound and a quarter of bread; one day, a quart of gruel, with a pound and a quarter of bread.

HORSLEY House of Correction.—One pound and a half of bread, one pint and a half of gruel, and one pound and a half of potatoes per day.

NORTHALLERTON.—Breakfast every morning, a quart of oatmeal porridge, and one pound and a half of bread.

Dinner.—Sundays and Thursdays, six ounces of boiled beef, and a quart of potatoes with salt. Mondays and Fridays, a quart of stew made of beef, ox-heads, bones, vegetables, oatmeal and onions, with pepper and salt. Tuesdays, a quart of boiled rice and milk, or a quart of stew same as Monday. Wednesdays and Saturdays, a quart of broth thickened with oatmeal, onions and vegetables, with pepper and salt.

Supper. Every evening a quart of oatmeal porridge.

CAMBRIDGE County.—Three pounds of bread, and one pint of small beer: thus distributed one pound of bread for breakfast; one pound of ditto with half a pint of beer for dinner; one pound of bread with half a pint of beer for supper.

IPSWICH County Gaol.—One pound and three-quarters of bread, and two ounces of cheese per day.

EXETER House of Correction.—Twenty-two ounces of wheaten bread per day; twenty-two ounces of bacon per week; and half a peck of potatoes per week.

HERTFORD.—Two pounds of bread of the best quality per day.

READING.—One pound and a half of bread per day; and a quarter of a pound of bacon every other day.

BRIXTON.—Three days in the week:—

Breakfast. Half a pound of bread.

Dinner. Half a pound of bread, a third of a pound of beef without bone, and half a pound of boiled potatoes.

Supper. A pint of soup made of beef, scotch barley, and herbs.

Four days in the week:—

Breakfast. Three-quarters of a pound of bread.

Dinner . ditto ditto, and a pint of soup made as before.

Supper. Half a pound of boiled potatoes.

N.B. In case of delicacy of constitution, the surgeon orders extra allowance; viz. a quart of soup.

This dietary has been in use for the last nine months. Feb. 1825.

GUILDFORD.—The same.

DORCHESTER.—Three quarts of broth per day, with a pound and a half of bread; the broth is made of grey peas and barley dressed each alternate day with two legs or shins of beef stewed down and in it, seasoned with pepper and salt.

STAFFORD.—One pound and three-quarters of bread, one pound of potatoes, and a quart of gruel for breakfast per day.

DURHAM.—Breakfast every morning, one quart of oatmeal porridge, made up with half a pint of milk;—the same for supper every day. One pound of bread per day. Dinners—Sundays and Thursdays, one quarter of a pound of dried fish, and one pound of potatoes.

Mondays, Wednesdays, and Saturdays, one quart of oatmeal porridge. Tuesdays and Fridays, two red herrings and one pound of potatoes. When potatoes are not in season, a quarter of a pound of rice is delivered in lieu of each pound of potatoes.

GLOUCESTER.—One pint and a half of water gruel for breakfast; one pound and a half of bread; for dinner five days of the week, two pounds of potatoes, on the other days, one pint and a half of soup made with beef and peas.

BEDFORD.—A loaf of bread weighing one pound fourteen ounces *every day;* a quart of soup containing peas, vegetables, and a portion of the meat of which the soup has been made, *three times a week.*

N.B. An alteration is on the point of being made, viz. to "increase the quantity of soup, so as to supply the prisoners with it six times a week instead of three." "No beer is allowed, and the meat, peas, vegetables, &c. for soup, are purchased with a portion of the money earned from grinding corn by the prisoners."

LEICESTER.—One pound eleven ounces of bread per day.

This ration is distributed every other day; and our correspondent adds, he is informed that some of the men will occasionally eat their two days supply of bread in one day.

ST. ALBANS.—One pound and a half of the best wheaten bread per day.

SWAFFHAM.—Two pounds of the best wheaten bread per day, and half a pound of cheese per week.

EDINBURGH BRIDEWELL.

Bread, from wheat, with the bran made up into loaves of the size of twelve to the weight of a quartern loaf (making five ounces each.) *Two* of these loaves are given to each prisoner *weekly*, viz. one on Wednesday and one on Saturday at dinner. Prisoners senteneed to be fed on bread and water only, have *three* of these loaves *daily*.

Oatmeal. Two-thirds of a pound avoirdupois per day for each prisoner; one half made into a chopin (quart) of porridge for breakfast, and the other half into a similar quantity for supper.

Barley. Four ounces avoirdupois per day for each prisoner, made into a Scotch pint (two quarts) of broth for dinner six days in the week.

Cheese. Four ounces avoirdupois to each prisoner every Saturday for dinner.

Small beer. One half pint, English measure, per day at breakfast, and one English pint every Saturday for each prisoner at dinner.

Salt. One ounce per day to each prisoner six days in the week, and half an ounce on Saturday, (cheese and beer being for that day's dinner.)

Flesh, usually ox-heads. Thirteen pounds weight for every twenty prisoners on Sunday, and the same quantity for every thirty prisoners on Wednesday, and during the other days of the week.

Vegetables. From the garden, as necessary, and in season.

Prisoners employed upon the Tread-wheels have been allowed an addition to the above dieting, as follows: If sentenced to bread and water, to have two of the five-ounce loaves extra daily; and if on the ordinary allowance of the prison, one extra loaf daily, with a quart of small beer for dinner, and a pint for supper.

DESCRIPTION

OF

THE FOLLOWING PLATES,

EXHIBITING THE

MACHINERY OF A CORN AND FLOUR MILL,

AND ALSO OF

A PUMP-MILL,

ON THE FOREGOING PRINCIPLES.*

(The same letters refer to the same parts in all the four plates.)

aa, Two tread-wheels, on which the men work, side by side, acting on the step-boards level with the centre, and holding a hand-rail breast high, (as shown in N° 3;) on one end of each of these tread-wheels are affixed the spur-wheels, *cc'*, which take into the teeth of each other, and the wheel *c'*, at the same time taking into and turning the nut or pinion, *d*; so that by detaching the spur-wheel, *c*, the machinery may be driven by *c'* alone, as occasion may require. The nut *d*, hangs on the shaft, *e*, which passes through the cross-wall, *f*, into the mill-house; as the room † or yard which contains the tread-wheels, is supposed to have no connexion with the other parts of the mill.

On the main shaft, *e*, is the bevilled wheel, *g*, which turns the pinion, *h*, on the upright shaft, *i*; and on the lower end of this shaft is fixed the spur-wheel, *k*, which turns the pinions, *ll*, and gives motion to the mill-stones, *mm*. On the upper end of the main shaft is the bevelled wheel, *n*, which takes into two similar pinions, *o*, *p*, turning each a horizontal spindle, *q*, *r*; on the end of the spindle, *q*, is a sheive or rigger, *q'*, with a double groove to carry two band lines, the direction of which is shown by dotted lines in N° 4. One of the band lines puts in motion the Dressing Mill, *s*, by means of its pulley and spindle, *t*, and the other drives a pair of malt rollers, *v*, by means of the rigger, *w*.

On the aforesaid spindle, *r*, is a rigger, *r'*, which, by means of a leather strap, turns occasionally the rigger, *x*, and the roller, *y*, round

* The machinery represented by the following plates is not exactly similar to that of the Mill at Brixton; they serve, however, to illustrate the mechanical principles on which these Mills are constructed.

† In all prisons, where sufficient space is afforded, it is desirable that the tread-wheels should be placed in the airing yards, and not in the buildings.

which a rope or chain is coiled, and passing over the pulley, *z*, serves to hoist up the sacks of corn, &c. to the top of the Mill.

Just over, and connected with the upright shaft, *i*, is a small vertical spindle 1; on the top end of this is a rigger, 2, which, by means of the catgut line, 3, turns the rigger, 4, and the spindle, 5, within the roof of the Mill-house, on the spindle, 5, are suspended the governor balls, 6, which have free liberty to rise and fall on a pin, or bolt, in the shaft, 5, at 7; the ends of the arms which carry the balls pass through the spindle, and are connected with the box, or block, 8, by the pins and joints, 9; the box, 8, is perforated, so as to rise and fall easily on the spindle, 5, and has a projecting pin from its top side, as at 10, which, as the spindle revolves, would, of course, strike against any object at 11 (suppose a bell handle) placed in its way. But when the machinery of the Mill has attained its proper speed, the the balls, 6, will rise by their centrifugal force, having receded so far from the centre, as to draw the box, 8, below the reach of the bell handle, 11, which will then cease to ring a bill, placed in some convenient situation for the purpose. But should the men at the wheels cease to keep up the requisite speed in the Mill-work, the balls will descend, and the projecting pin on the box, 8, striking the handle placed in the proper situation for that purpose, will continue to ring the bell till they go on again properly; and by this means, a certain check will be kept on the labourers, and the Governor or Task-master apprised, even at a distance, that the full work is not performed.

REFERENCE TO PLATE, N° 5.

This plate shows a plan and section of a small building, containing the Tread-wheel and machinery for working a set of pumps, for the purpose of raising water to supply the establishment, or any neighbouring district.

(The same letters refer to the same parts in each.)

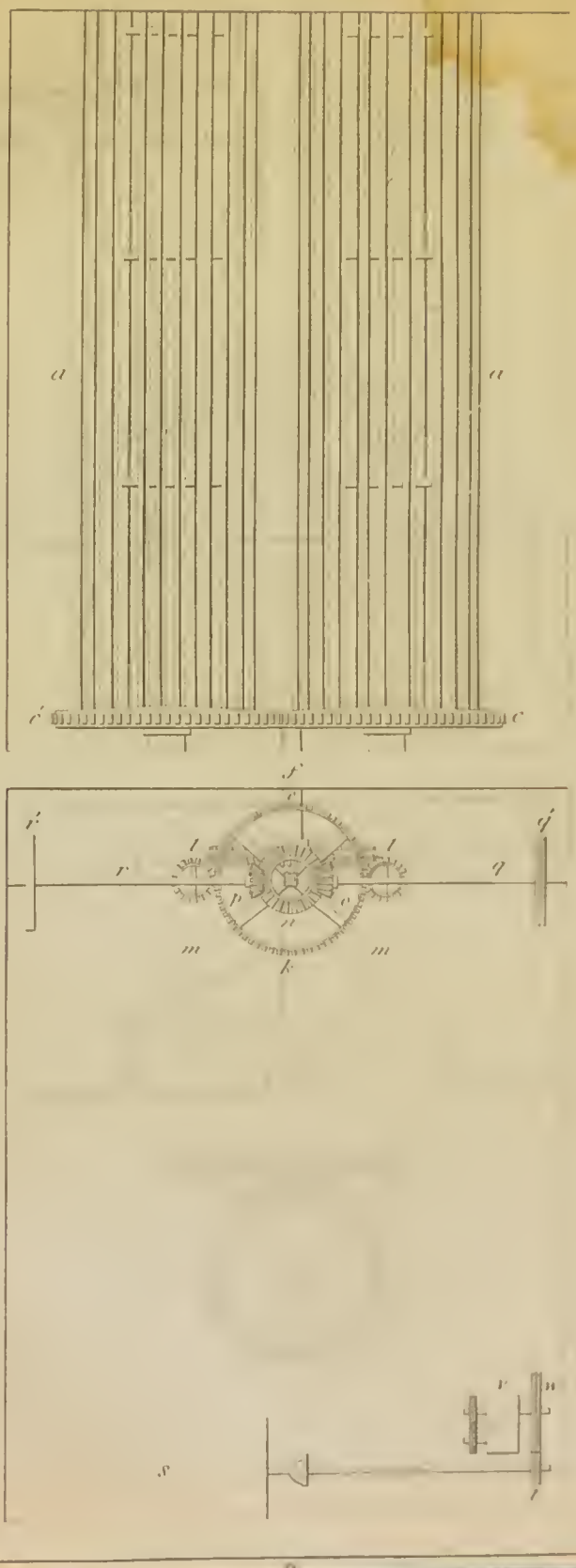
A, The Stepping or Tread-wheel, on the axis of which is the wheel, *B*, taking into the pinion, *C*, on the shaft, *D*. On this shaft is a wheel, *H*, turning the pinion, *I*, on the spindle, *K*, which is the crank spindle of a three-throw pump engine, as usual, from which the pump-rods, 1, 2, 3, descend into the well.

L, A fly-wheel to regulate the motion.

T. Bensley Printer, Crane Court, Fleet Street.

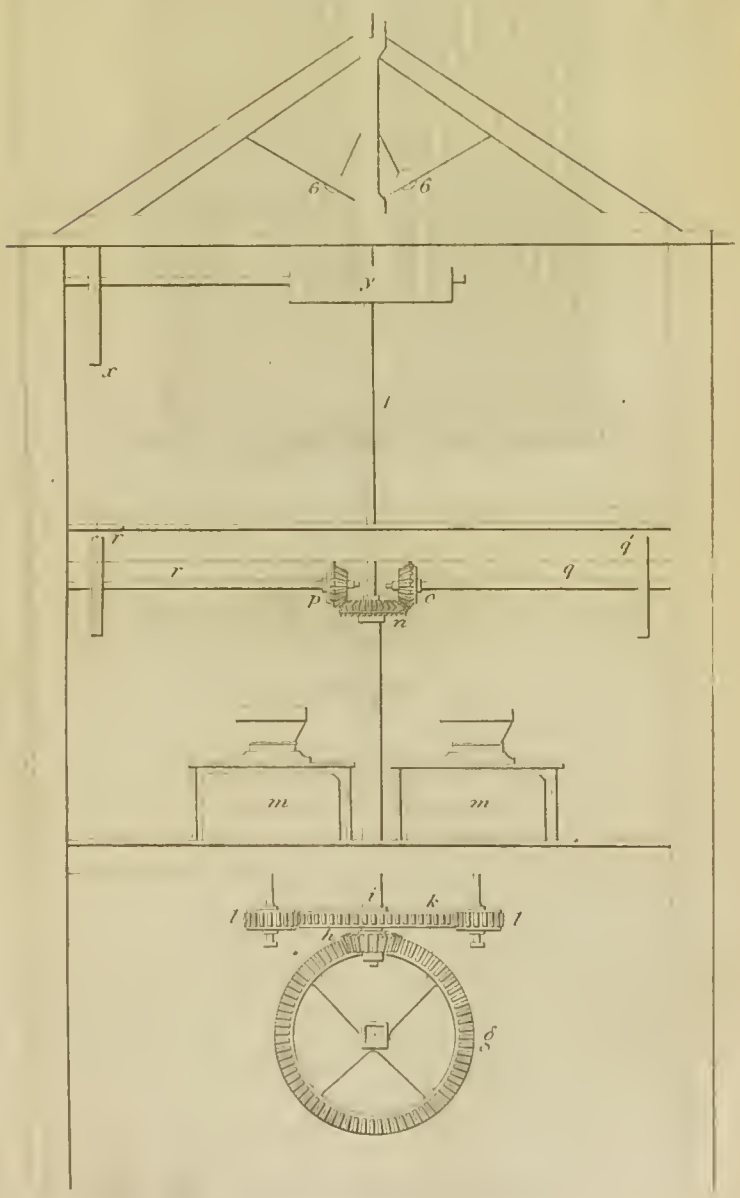
Ground Plan of a design for a Prison Corn Mill.

A



N.º 2.

Cross Section of design for Prison Mill, shewing the elevation of Machinery as seen from the end B of Plan.



0 1 2 3 4 5 10 15 20 Feet

Designed by Mr. Willm. Cubitt, civil Engineer of Ipswich.